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A Forester's Guide to Observing Wildlife Use of Forest Habitat In The South

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A Forester's Guide to Observing Wildlife Use of Forest Habitat In The South

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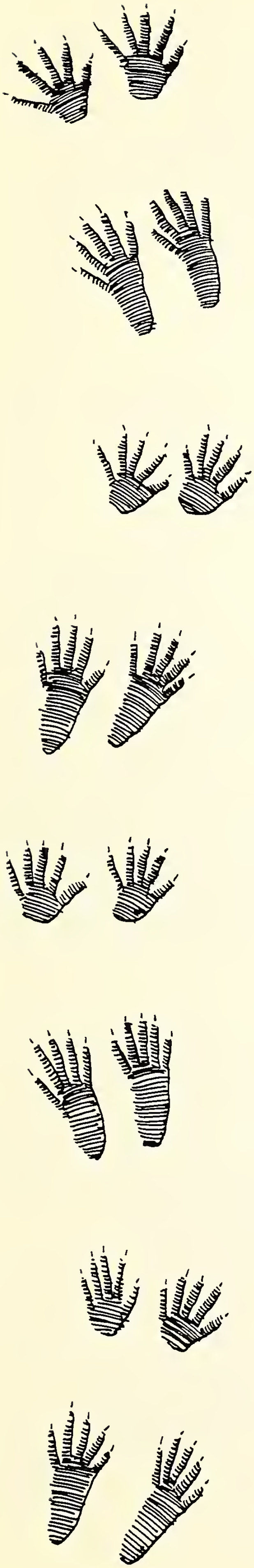

FOREWORD

Foresters have a unique opportunity to help meet the habitat needs of wildlife species using forest habitat. The more than 200 million acres of commercial forest land in the South are constantly being treated silviculturally by harvest and improvement cuts, prescribed burning, site preparation, planting, and other treatments. Conservatively, 10 to 15 percent of this area (20 to 30 million acres) is estimated to be treated in some form each year.

The purpose of this publication is to help improve foresters' knowledge and ability to discern specific wildlife use of these forests and dependence upon them. This increased awareness should help foresters coordinate recommended treatments to protect and enhance specific wildlife habitat objectives. The following 10 chapters on observable signs and activities of selected wildlife in the South are written by various authors, who have freely shared knowledge gained from long years of study and experience in wildlife management and research. Readers who use the authors' insights should achieve improved consideration for wildlife in silvicultural plans, prescriptions and practices.

TABLE OF CONTENTS

Page
Foreword 1
Furbearers, by Edward P. Hill 2
Black Bears, by Michael R. Pelton 8
White-tailed Deer, by Lowell K. Halls 12
Squirrels, by Chester E. Billie, Jr. 15
Quail, Doves, and Rabbits, by George A. Hurst 18
Woodcocks, by James R. Davis 21
Cavity Nesting Birds, by James G. Dickson and Richard N. Conner 23
The Raptors or Birds of Prey, by Malcolm G. Edwards 30
Wild Turkeys, by Herman L. Holbrook and William M. Healy 32
Other Birds, by Robert G. Hooper 35

FURBEARERS by Edward P. Hill*

Some furbearers of the South, such as the beaver, muskrat, nutria, river otter, and mink are chiefly aquatic and their sign will usually be seen only in or near the water's edge, and along small streams. Other species such as the foxes, skunks, coyote, bobcat, and opossum are more often found on upland sites. Therefore, field workers set on observing furbearer sign should remain aware that the site will determine, in great measure, the sign that will be present. The amount of furbearer sign in a given area varies with population density, season, and factors that influence the capacity of a site to accept and retain tracks, scats (droppings), and other signs. Snow does not generally cover the gound for long periods in the South and the area is usually without a blanket of favorable substrate for recording tracks. The moderate climate of the region, however, produces less freezing than in other areas, and therefore soft mud and unfrozen sand substrates are frequently present to record tracks.

As a group, furbearers are relatively small, have padded feet and are thus less apt to leave tracks than heavier animals, particularly those with hooves. Therefore, developing expertise in recognizing furbearer sign requires more intense and careful observation than is necessary for many of the larger wildlife species. In addition, furbearers are usually nocturnal or crepuscular, avoid contact with humans, and are seen less frequently than other wildlife.

In addition to scats and evidence of feeding, furbears leave their footprints and depressions where their tails or other body parts have been dragged along a suitable surface. Obviously one of the greatest aids in recognizing furbearer sign is to become familiar with the shape and size of appendages as well as the gait of each species.

Without their tracks, it may be difficult to identify the species feeding on aquatic vegetation in the summer because multiple species such as beaver, nutria and muskrat may be feeding on the same vegetation. In the winter, beaver feeding can usually be separated from that of the other two species by measuring the width of a single incisor mark on cut vegetation. A single incisor of an adult beaver is usually 0.2 inches (5 mm) or more in width, while single tooth marks that are smaller may have been made by nutria, juvenile beaver, muskrat, or rabbits.

Beaver

Because of its needs and capability to modify habitat for its aquatic existence, field sign left by the beaver is more obvious than that of any other furbearer. Lodges, dams, (figure 1), felled trees (figure 2), barked limbs, clearings, and ponded water, particularly if present in combinations, are recognizable even to the unskilled observer. Recognition of other sign requires keener observation as it may vary between winter and summer with changes in food habits. Beavers tend to eat cambium of woody shrubs and trees during winter, whereas in summer they eat primarily succulent parts of both herbaceous and woody plants. Summer feeding behavior leaves less sign, particularly where young beaver have recently moved into a new territory during the spring dispersal.

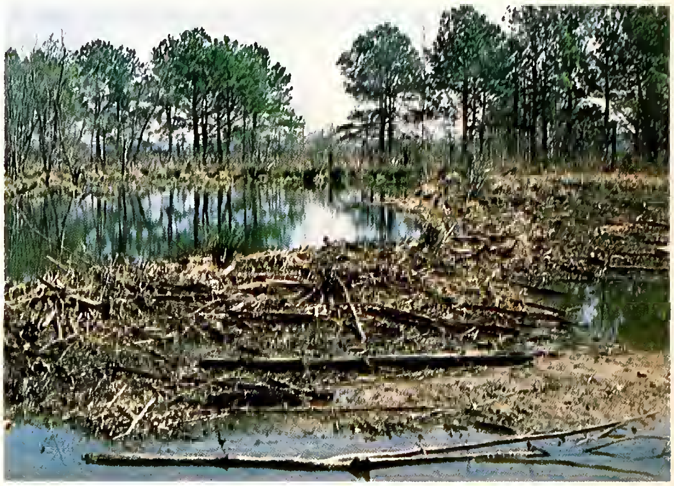

Figure 1.–A beaver lodge in a small lake.

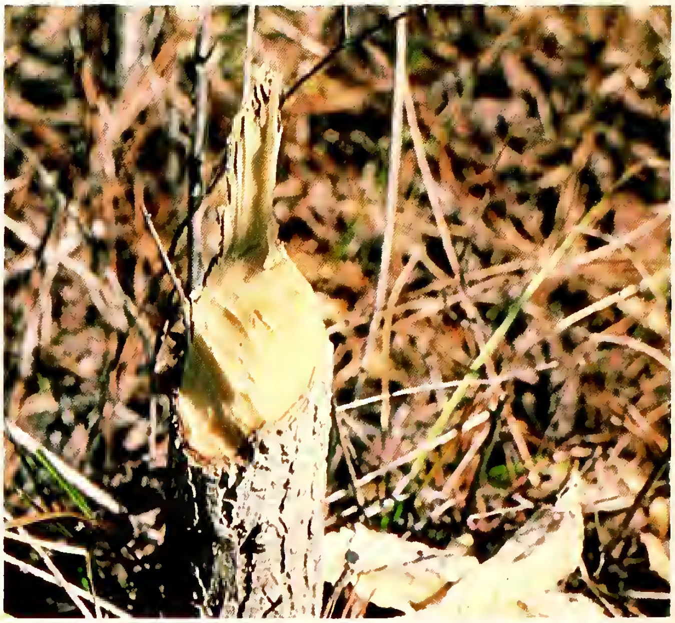

Figure 2.–Trees felled by beaver show characteristic tooth marks.

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Beavers usually cut food items and drag them to shallow water before they begin to feed. This behavior usually will leave drag marks on soft sand or mud and trails through grass or brush leading to the water edge. Other than tracks (figure 3), tail drags, cuttings and evidence of feeding (figure 4), trails may be the main beaver sign observed adjacent to rivers and large impoundments where neither dams or lodges are normally constructed. Only on the northern fringe of the southeastern states are submerged food caches prepared.

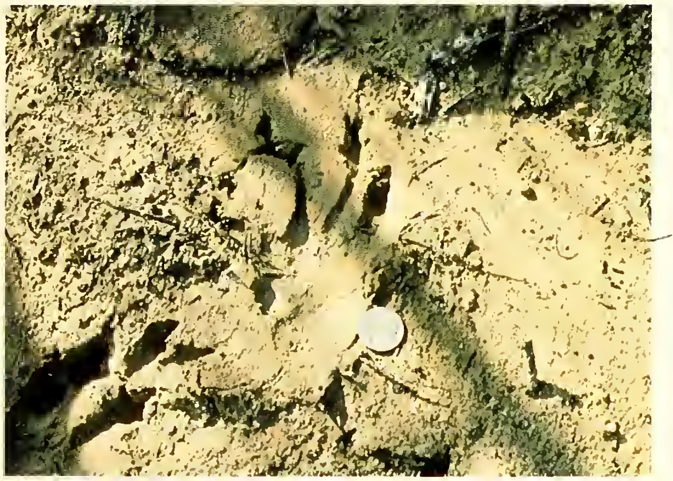

Figure 3.–Tracks of beaver in soft moist soil.

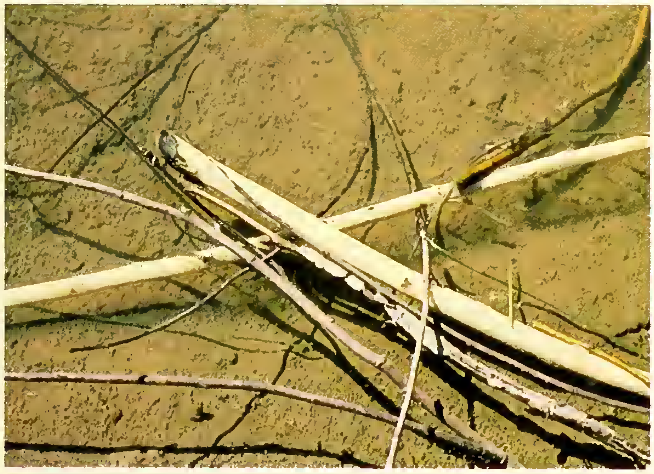

Figure 4.–Beaver presence is always accompanied by food remnants and debarked limbs of trees.

Foxes

Red and gray foxes occur throughout the southeast. While both species use mixed habitats that provide suitable cover and food, the red fox seems to prefer habitats with a greater component of open land.

During winter, fox trails can frequently be seen in old fields, wet grassy areas, and in unmowed pastures. These trails are 2 or 3 inches wide (5.1 or 7.6 cm), go in one general direction, and may be little more than a series of intermittent but alined depressions that are made in the grass as foxes pass repeatedly. Where these trails cross exposed mud or wet sand, foxes will leave recognizable tracks.

The red fox has larger paws than the gray fox. In addition, the front paws of the red fox are usually about half an inch (1.3 cm) longer than the hind paws. The tracks of the red (figure 5, right) rarely show heel or toe pads and are generally 2 inches (5.1 cm) or larger from front to rear, whereas the track of the gray fox (figure 5, left and figure 6) clearly shows heel and toe pads, and is 1⅝ inches (4.1 cm) or less in length. Tracks of both species are usually shorter from front to rear than 2½ inches (6.4 cm), not including toe nails (which show prominently in soft mud). Fox tracks are most frequently seen in bare areas, sand, or soft mud along ditches, fire lanes, logging roads, and recently disturbed soil. Except for the confusion with tracks of small dogs, fox tracks can usually be distinguished from those of other canines by size alone. Usually,

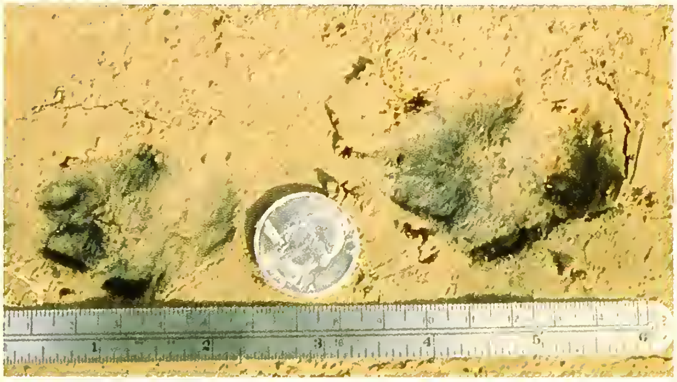

Figure 5.–Tracks of gray fox (left), and red fox (right).

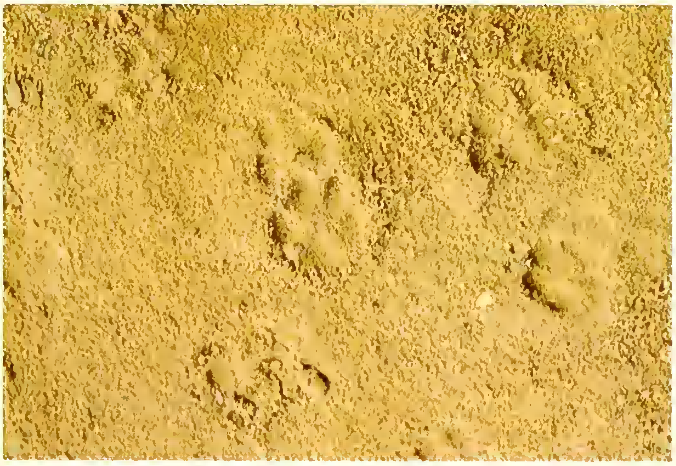

Figure 6.–Gray fox tracks.

tracks of small dogs will be more rounded and will show more prominent nail prints.

The content of scats varies with the season and the foods eaten, but scats are generally about ¾ inch (2 cm) in diameter and in segments less than 3 inches (7.6 cm) long. They will frequently contain seeds, plant parts, hair, bones, and remains of other nondigestibles that reflect seasonal food habits.

Raccoon

Of all the furbears, the tracks seen most frequently in the South are those of the raccoon. This animal occurs throughout the area in both rural and urban habitats, and is more abundant in lowland and plateau areas than in the Appalachian mountains and associated foothills where it is intensively hunted.

Seasonal movements associated with feeding habits tend to distribute raccoons along streams, lakes and wet sites in winter and upland situations in summer. Raccoon tracks (figure 7) can usually be found in heavily traveled trails along the edge of wet sites and streams during winter. Their scats are frequently seen on logs or in trails beside streams in winter and in trails, roads and fields in summer. Contents of the scats usually reflect the use of mostly vegetable matter, seeds and plant parts in summer and animal matter (bony parts) in winter.

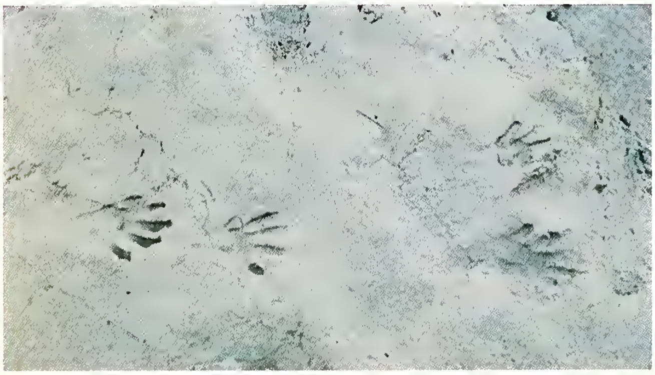

Figure 7.–One is likely to find raccoon tracks around water edges.

Bobcat

Other than its scats, occasional claw or scratch marks, and tracks, the bobcat leaves relatively little sign. These animals occasionally cover the uneaten portions of road-killed or other deer with leaves or other debris and return to them for subsequent feeding. They frequently leave scratch or claw marks on trails, fire lanes or logging roads that appear to be associated with half-hearted efforts to cover their scats. These scratch marks will be present only on recently deposited scats which will generally be darker, whereas older scats become weathered and take on the color of the hair they contain (figure 8a). They remain relatively tightly bound even when weathered as opposed to raccoon scats which are smaller, contain less hair, are loosely bound, and begin to disintegrate upon weathering. Bobcat scats are almost always filled with hair of small rodents or rabbits.

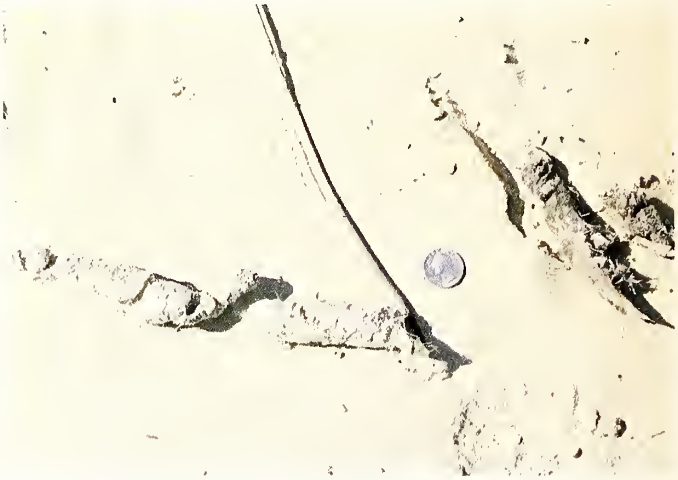

Figure 8a.–With age bobcat scats take on the color of the hair they contain.

Bobcat tracks are almost round, about 2 inches (5.1 cm) in diameter and showing a pad and toes (figure 8b). Bobcats frequently travel along dirt roads, trails, and fire lanes, and their tracks will occur in an evenly spaced alternate pattern similar to that made by a walking human.

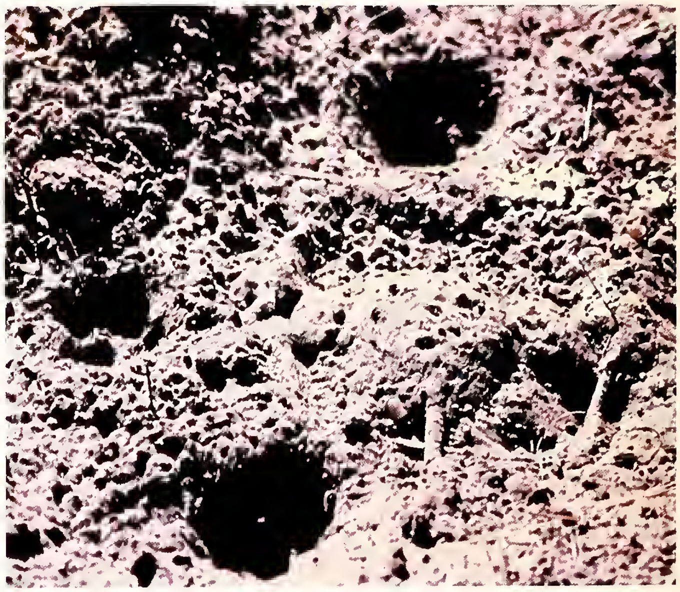

Figure 8b.–The bobcat leaves almost rounded tracks.

Mink

The mink is a small Mustelid that leaves relatively little sign during its periods of activity. The most frequently observed sign of the mink is its tracks, which may be found in suitable substrate along wetland shores, creeks, and small streams. The tracks are usually smaller than 1½ inches (3.8 cm) in width and slightly wider than long (figure 9). Pads of both front and hind feet show clearly, as do the fleshy areas of each of the five toes.

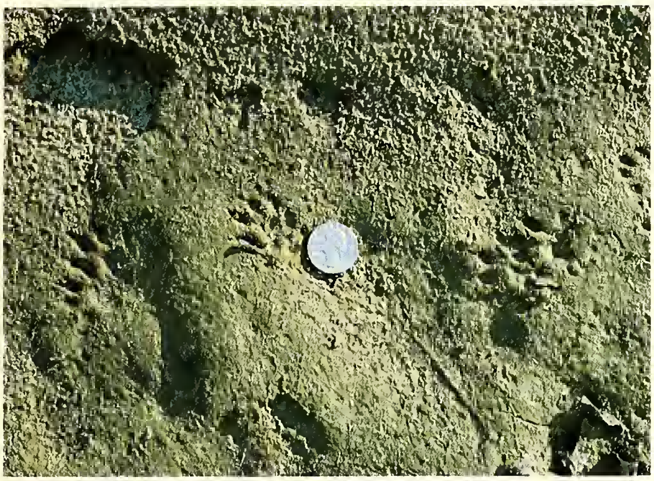

Figure 9.–Tracks of mink.

Muskrat

In addition to the tracks of its large hind feet and smaller front feet, the muskrat usually leaves an accompanying serpentine mark that is made by its almost hairless tail (figure 10). Muskrats use marsh vegetation to construct houses that may extend 3 feet (92 cm) above the shallow water or shoreline. They also deposit their dark droppings in clusters at the water's edge, on rocks or on partly submerged logs. These droppings are usually ½ to ¾ inches (1.3 to 2 cm) in length.

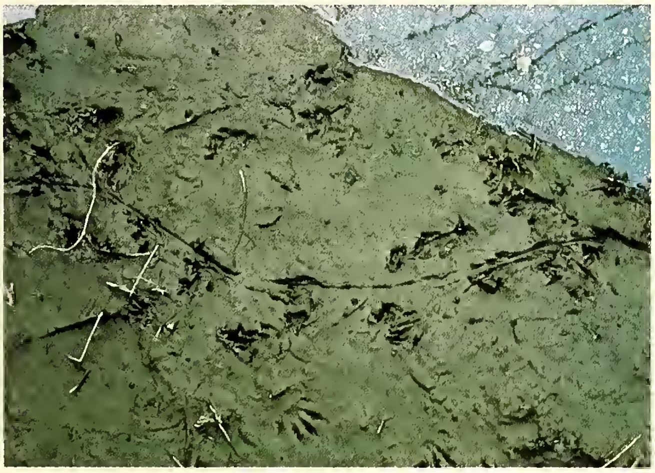

Figure 10.–Note the serpentine tail-drag made by the muskrat.

Closer observation may reveal muskrat feeding sign. They frequently dig small tuberous roots in shallow water or near the water's edge. Muskrats also feed on corn in fields near streams or marshy areas. In addition, they feed on small mussels which they take to the shore and open. Along large rivers they are known to take mussels at depths greater than 5 feet (152 cm) and leave large piles of the shells along the shore (figure 11).

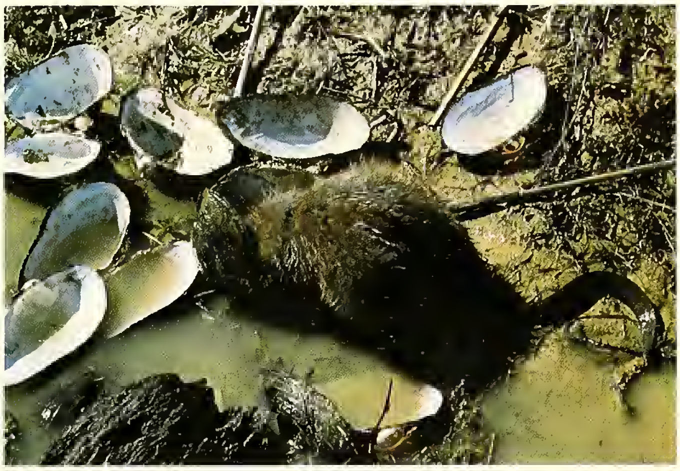

Figure 11.–Muskrat are known to feed on fresh water mussels.

Nutria

The nutria occurs in marshes and along the coastal regions of Louisiana, Mississippi, Alabama, northwest and east central Florida and parts of the Chesapeake Bay in Maryland. In addition, it occurs in isolated locations in southern Georgia and as far as 150 miles (241 km) inland along some of the large rivers of Alabama, Georgia and Mississippi that flow into the Gulf of Mexico. Tracks of the nutria are similar to those of the muskrat in that they are usually accompanied by a serpentine impression between the tracks (figure 12a) caused by dragging its long,

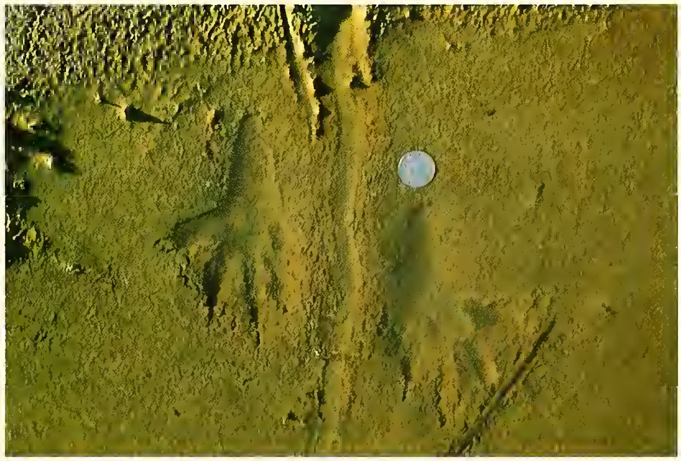

Figure 12a.–Nutria tracks.

round, scantily haired tail. The difference between the tracks of the two species is that the tracks of the nutria are usually much larger (between 4 and 6 inches [10 to 15 cm] in length) and there are webs between the four inside toes of the hind feet, whereas those made by the hind feet of the muskrat are less than 2 inches (5 cm) in length and are unwebbed. The scats of nutria are about ½ inch (1.8 cm) in diameter and 1½ inches (3.8 cm) in length (figure 12b.).

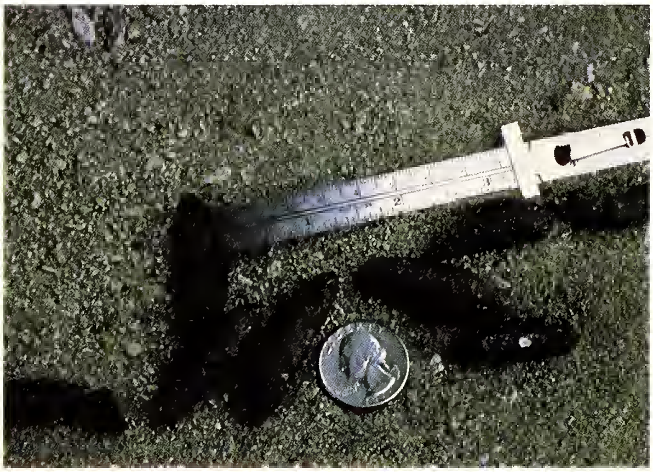

Figure 12b.–Some scats of nutria appear shiny and black, while others may be gray-green and contain longitudinal grooves.

Opossum

The opossum usually leaves the front and rear tracks of each stride superimposed or close to each other. The front paw leaves an almost star-shaped print with the toes almost even in length. Tracks of the hind feet show a prominent inside toe and four outside toes that are similar in length and are generally parallel, but held separate from the inside toe (figure 13).

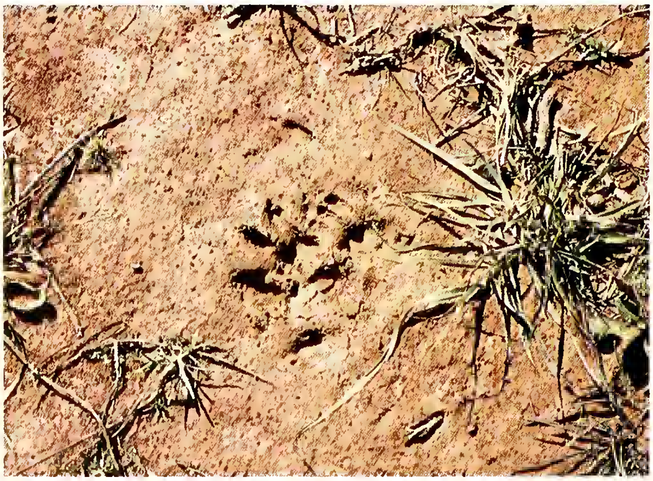

Figure 13.–When walking, the oppossom places the hind paw almost directly over the track left by the front paw.

River Otter

The major field signs that the river otter leaves are its tracks and scats. Otter tracks are usually accompanied by a drag mark from its long tail (figure 14). Otters have favorite play areas that may be worn slick where they frequently enter or leave the water. Such areas may be seen along streams or lakeshores, but are easily confused with similar slides made by beavers, muskrats, and nutria. Individual tracks are about 3 to 3½ inches (7.6 to 8.9 cm) round and show five toes. In a running gait the otter may leave tracks in clusters of four.

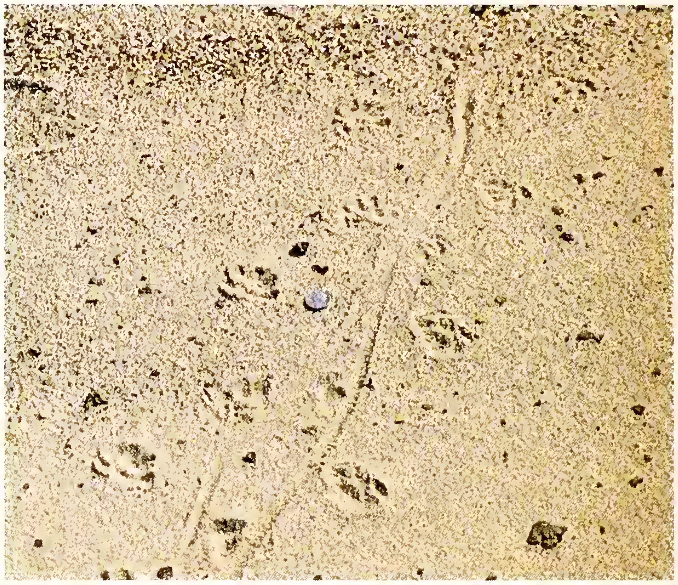

Figure 14.–River otter often leave a drag mark made by the long tail.

Scats may be numerous and may be repeatedly deposited in the same locality. Such depositories or otter toilets will usually be adjacent to a stream, lake, or beaver pond. Individual scats will contain fish scales and bony parts of crawfish or crabs (figure 15).

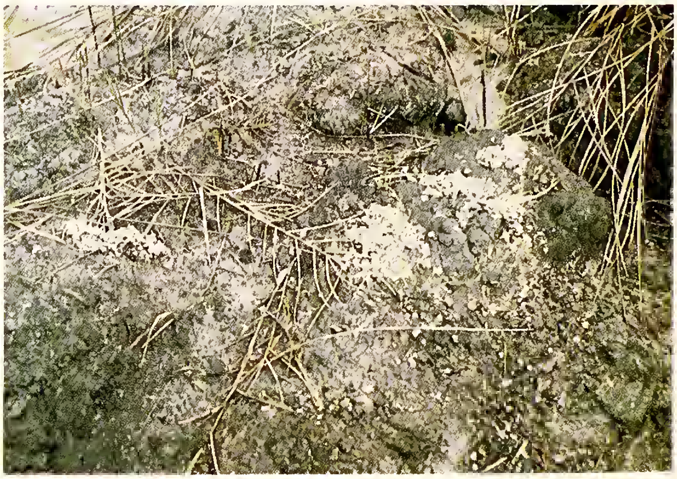

Figure 15.–Otter scats are often repeatedly deposited in the same area.

Coyote

With the elimination of the red wolf from most of the South, no animal has filled the role of a large predator for several years. This situation has changed recently as isolated populations of coyotes have become established, the largest and perhaps the oldest occurring in an area of about 20 counties in south central Georgia. Other smaller populations are in east central, northwestern, and west central Alabama, east central, northeastern, and north central Mississippi, and southwestern Tennessee. Coyotes are more common in Arkansas and Louisiana.

In addition to its tracks and scats (figure 16), the coyote may often reveal its presence by group howling in response to simulated howls or other sound stimuli. These vocal responses contain the yip, yip, yip sounds that are typical of the individual coyote.

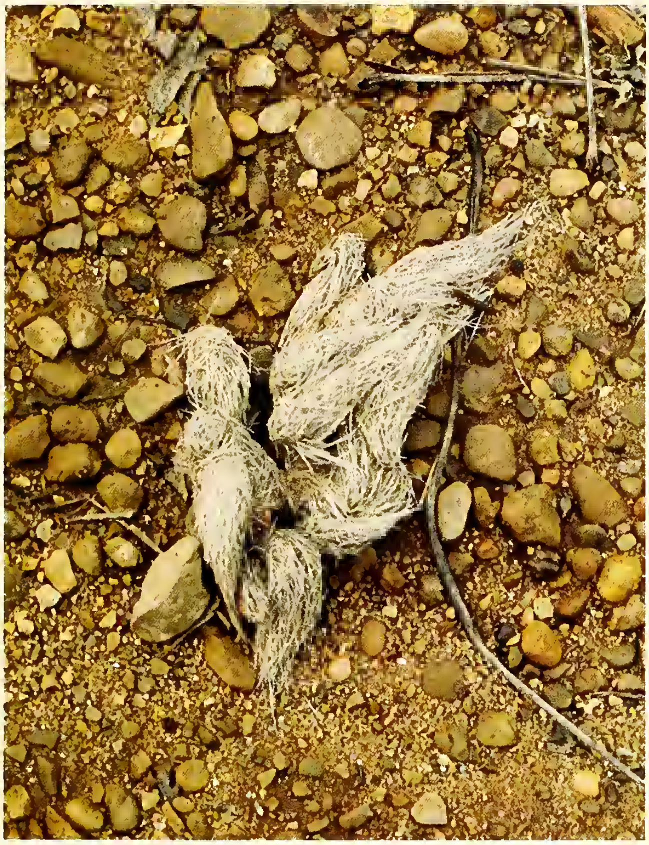

Figure 16.–Deer hair can be seen in this coyote scat.

Tracks of the coyote are slightly longer than wide as opposed to dog tracks, which tend to be more rounded. Like the red fox, the front foot of the coyote is approximately ¼ inch (0.6 cm) longer than the hind foot. Typically, only the nails of the two middle toes will show in tracks (figure 17), whereas dog tracks normally display the nails of each toe.

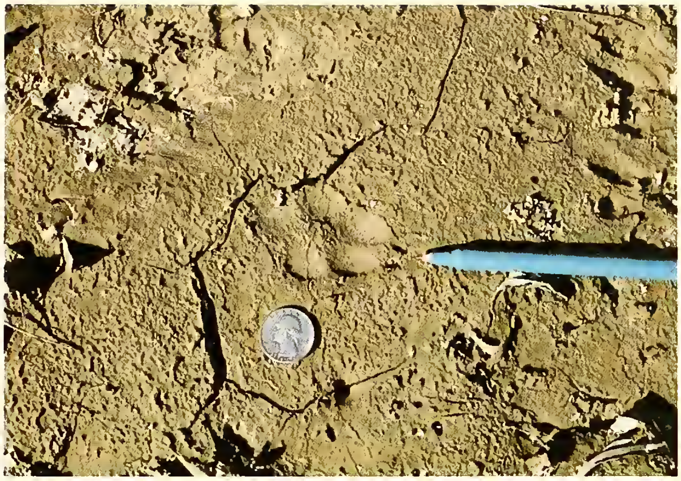

Figure 17.–A coyote's track is proportionately longer than wide, whereas a dog's track tends to be more rounded.

BLACK BEARS By Michael R. Pelton*

Black bears are found on several national forests and wildlife refuges in the South, both in the mountains of the Southern Appalachians and the swamp and bottomland habitats of the coastal plain. They are the largest game animal in the region, but they are also the least visible. Black bears are shy and secretive animals, and they take advantage of the rough terrain and thick understory that typically characterize their habitat. Because of this and the fact that they occur in relatively small numbers throughout their range, they are seldom observed. An occasional individual bear is attracted by the garbage or food of people. This attraction becomes greater than the animals' fear of humans; bears are then observed at garbage dumps, campgrounds, or along roadsides. However, these individuals represent a very small and unique segment of a bear population and typically end up being trapped and moved or killed.

Feeding

Although wild bears are seldom if ever seen, it would seem logical that such a large animal would at least leave some observable sign in areas it frequents. This, in fact, is the case. One of the most abundant and easily observed indication of their presence is signs of their feeding activities. After emerging from winter dens in April, black bears are faced with rather bleak food resources. Bears essentially resort to "grazing" on available grasses and other early herbaceous plants until more abundant food sources are available later in spring. However, signs of feeding may be difficult to observe before late May. A preferred food of black bears in spring in the mountains is the parasitic plant, squawroot (figure 18). This plant grows on the roots of oak trees; patches of the freshly emerging plant are frequently seen scattered by the feeding activities of black bears. One of the more obvious signs of feeding activities are scats. Scats of black bears are normally easy to identify because of their size and content (figure 19, a-d). Many of the plant parts consumed by bears are apparently not easily digested by them. Consequently stems, leaves, and seeds can be observed in the scats. Scats of black bears are normally formless and 4 to 6 inches (10-15 cm) across. They may be of a very loose consistency in spring when they are feeding on grasses and other herbaceous plants. As summer approaches, a wide variety of berry crops becomes available such as blackberries, raspberries, serviceberries, huckleberries, and blueberries. Scats during this period appear dark and formless, and berry seeds are obvious.

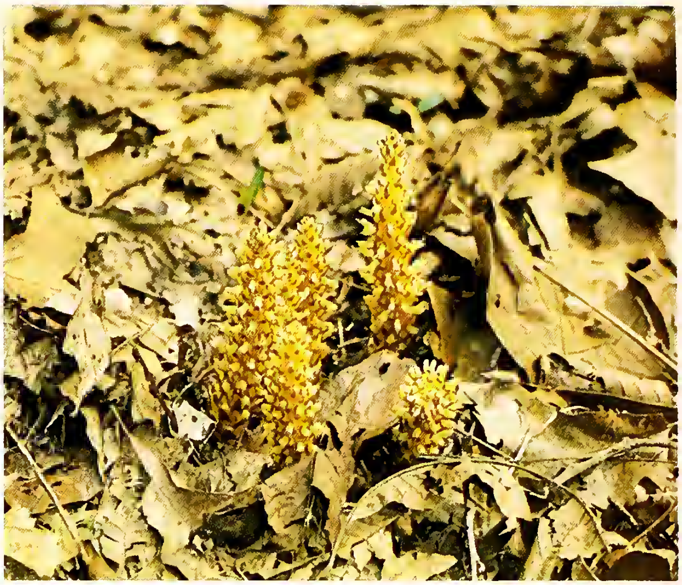

Figure 18.–Squawroot, a parasitic plant preferred by bear in the spring.

Freshly-made paths can sometimes be observed through raspberry or blackberry patches as well as well-worn trails through blueberry or huckleberry thickets. Black bears are very adept climbers. For that reason tree-borne soft or hard mast is available to them even before it completely ripens and falls to the ground. Limbs are broken from trees such as serviceberry or wild cherry in pursuit of these fruits. To feed on oak acorns, bears climb on occasion to the top of white or red oak trees and chew and claw limbs off as large as 2 to 4 inches (5 to 10 cm) in diameter. Such a "pruning effect" is normally evident where such activities have taken place (figure 20). As hard mast becomes a more important part of their diet in late summer and early fall, scats appear more grayish-brown and the remnants of the "meat" and shells of acorns, hickory nuts, sassafras, or black gum seeds are readily observed in the scats. Bears also take advantage of concentrated sources of food such as berry patches, pockets of hard mast, or even garbage dumps. Consequently, bear sign around such locations normally will be abundant and scats will generally reflect their feeding on those items in abundance.

Black bears expend most of their energy consuming plant materials; they are very opportunistic feeders and spend little time and

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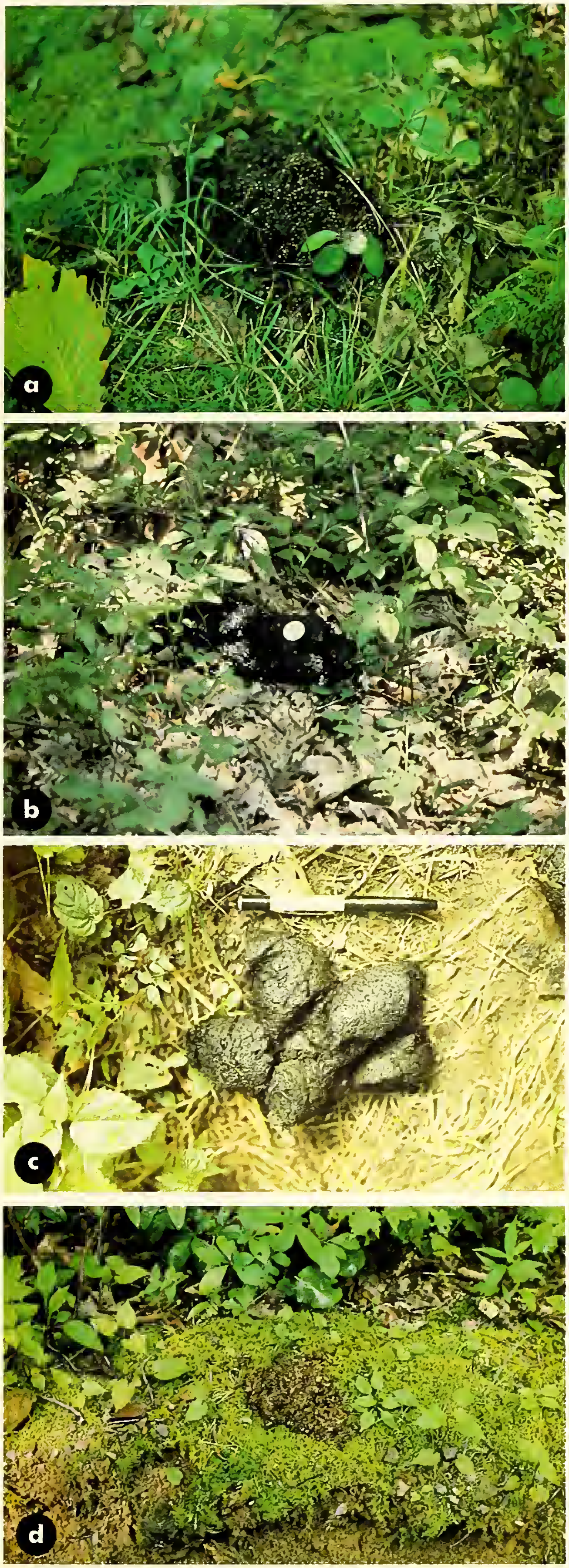

Figures 19a-d.–Bear scats vary in appearance because of the animals' diet. The scat shown in (19d) came from bear feeding on squawroot in the spring.

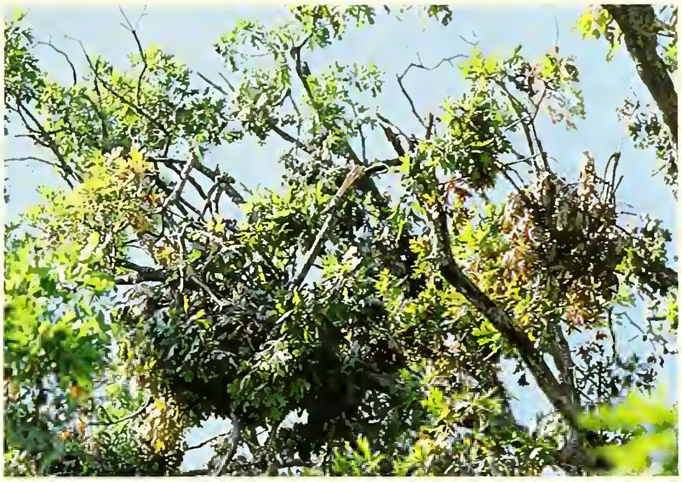

Figure 20.–Tree breakage resulting from bears feeding on oak mast in the fall.

effort in pursuit of more mobile animals. Animal materials make up less than 10 percent of the diet of black bears. Two important signs of feeding on animal matter are freshly-dug yellow-jacket nests in August and September (figure 21a) and ripped-open, rotten logs containing beetles (figure 21b). Obviously, scats and other signs of feeding activity are only visible during the period when bears are actively feeding. Thus, one can expect to observe such signs only between May and late October each year.

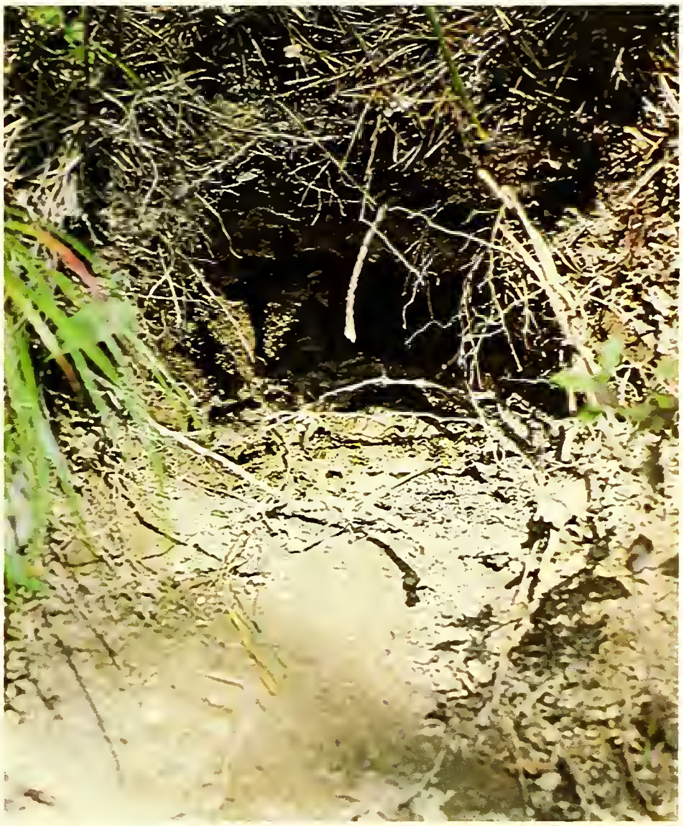

Figure 21a.–Yellow-jacket nest, freshly dug by bear.

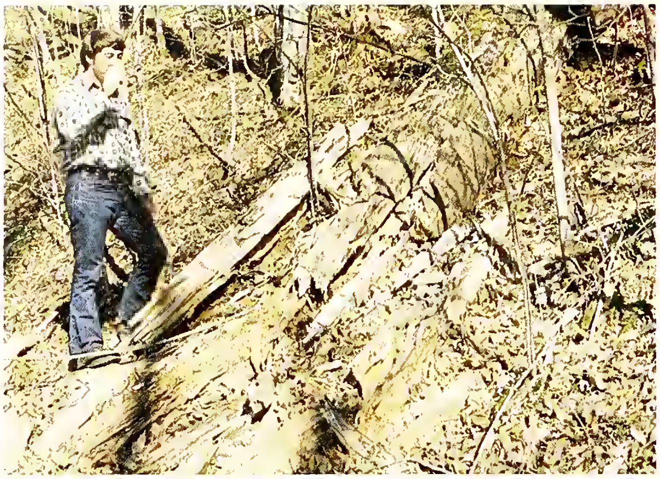

Figure 21b.–This log was torn apart by a bear searching for beetles.

Trails and Tracks

Besides being opportunistic feeders, black bears are also habitual animals that regularly utilize game trails. Such trails are good places to find scats, other signs of feeding activity, and sign such as tracks (figure 22). However, unless ground conditions are favorable (i.e. mud or soft sand and ground clear of leaf litter and debris), bear tracks are difficult to observe. The front and back foot pads are distinctively different between themselves and among all other mammals (figures 23 and 24). A well-made track will show the large pad and five toes; the size of the front pad of an adult bear ranges from 3½ to 5½ inches (9 to 14 cm) wide and from 1.6 to 2.8 inches (4 to 7 cm) long. Rear pad measurements average 3.9 inches (10 cm) wide and 5.1 inches (13 cm) long.

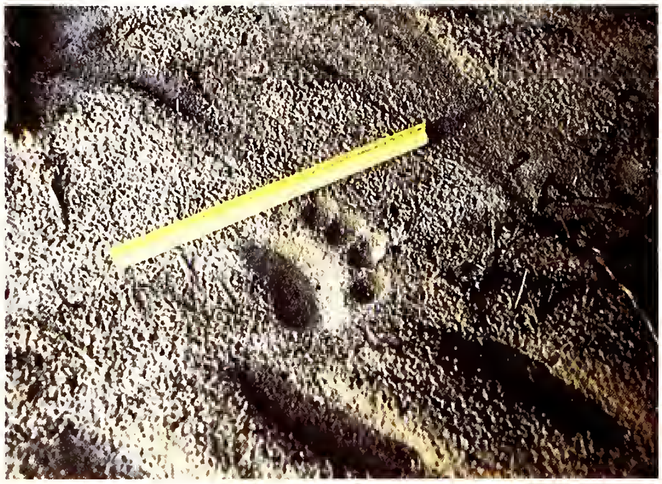

Figure 22.–Bear paws prints are large and easily distinguishable from other animal tracks.

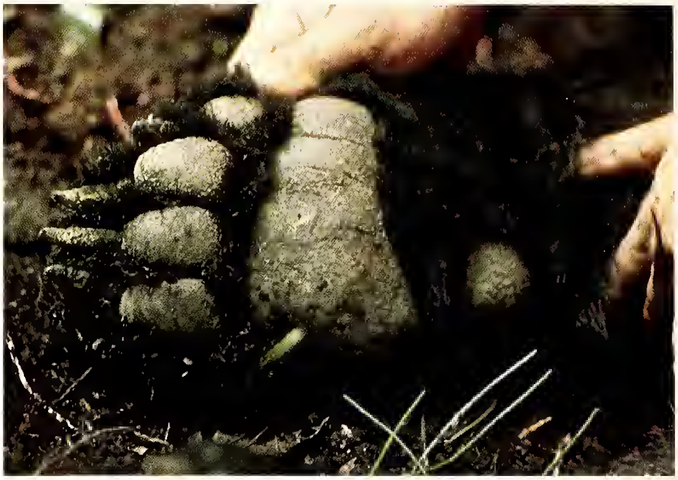

Figure 23.–Front paw of bear.

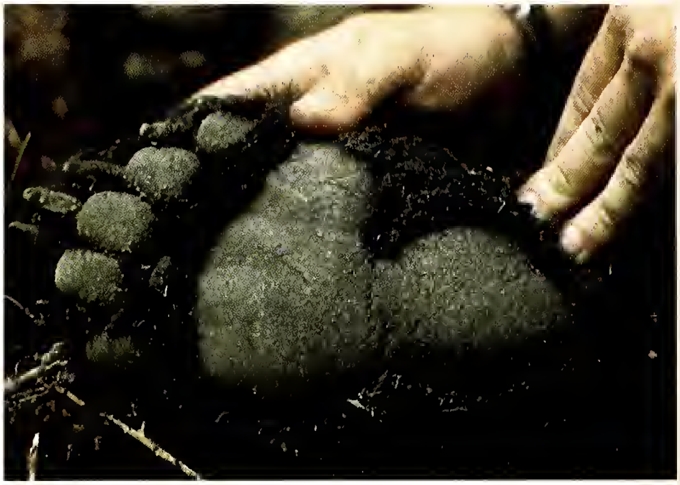

Figure 24.–Hind paw print of bear.

Beds and Dens

Black bears are crepuscular animals; that is, they are most active in the early morning and late evening hours. During the interim they often rest, forming an indentation or slight depression on the forest floor similar to a white-tailed deer "bed" (figure 25). These sites often can be recognized by the occurrence of scats around the periphery.

Black bears are closely associated with trees for reasons other than their use for escape cover and feeding activities. Wherever trees are large enough (greater than 3 feet [1 m] in diameter), cavities formed by wind or lightning damage and decay result in the use of suitable cavities by bears as winter dens (figure 26). Black bears prefer this type of den and consequently climb marks are often evident in the bark of such trees. Climb marks often will be visible on trees producing mast, too.

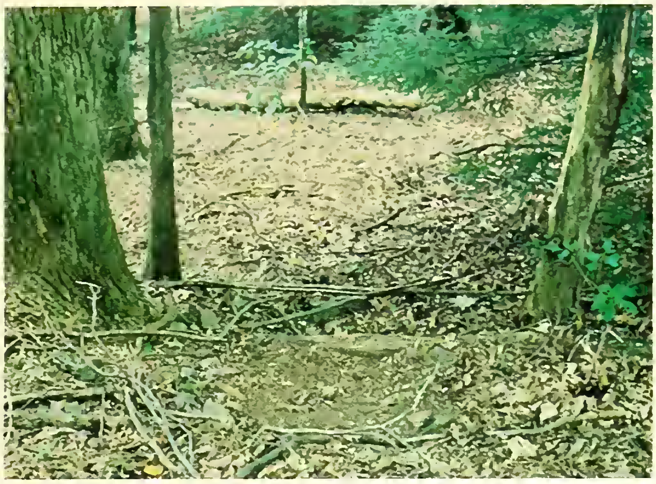

Figure 25.–A summer bear bed is similar to that of a white-tailed deer.

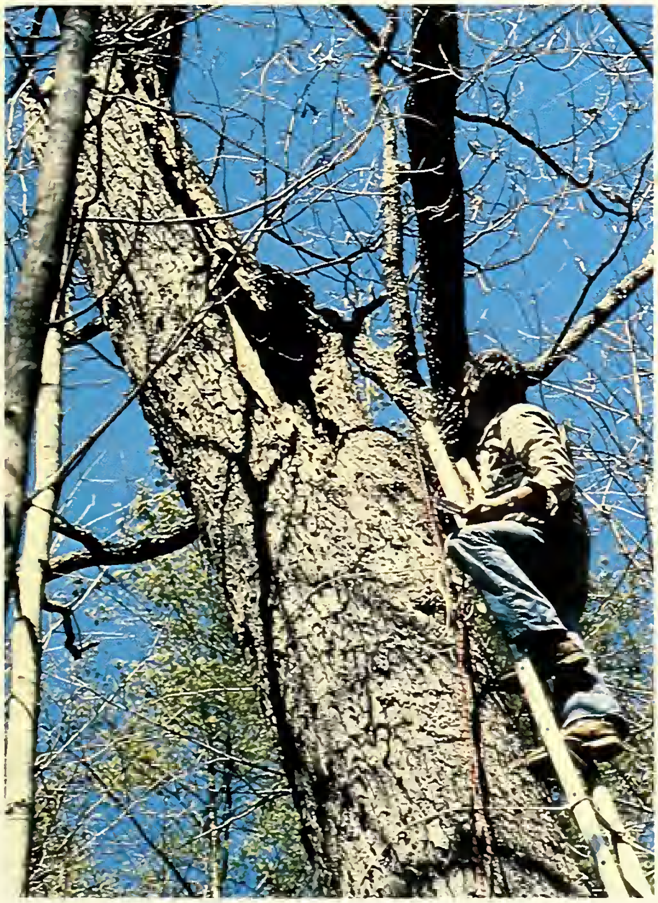

Figure 26.–Bears use trees similar to these for winter dens.

Tree Markings

Black bears also "mark" trees by biting and scratching at approximately 5.3 to 5.6 feet (1.6 to 1.7 m) above ground (figure 27). Such trees are located along well-established game trails or man-made trails, and new marks can normally be distinguished from old ones. Both angiosperms and gymnosperms may be marked, and marks may occur on small or large trees. The incidence of marking normally peaks during the breeding season in July. Although the exact function of marking in a bear population is unknown, it is a highly visible form of sign and easily discernable by a human observer.

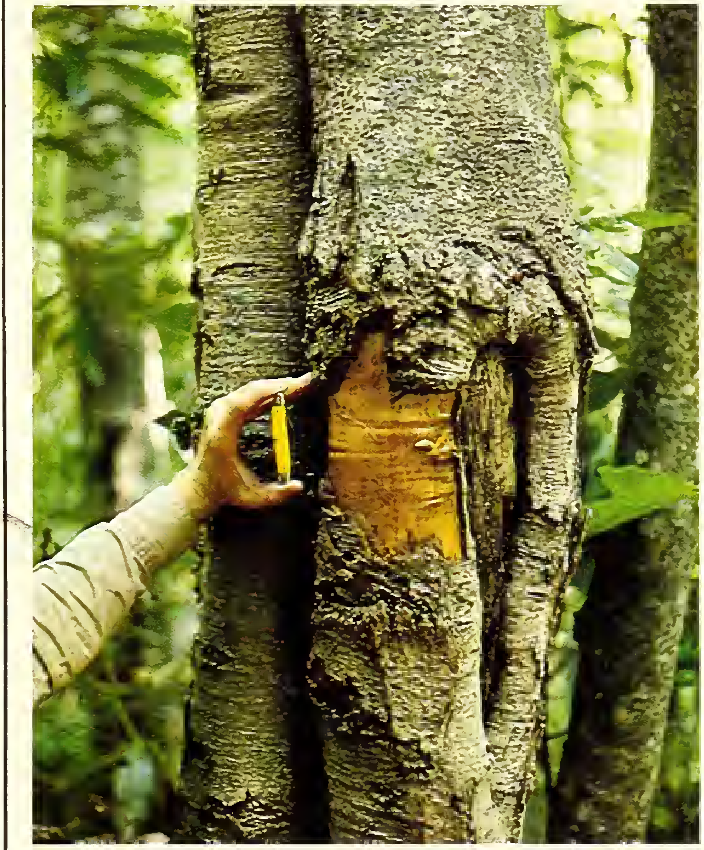

Figure 27.–In bear country, it is not at all unusual to find bite marks made by bear.

WHITE-TAILED DEER

by Lowell K. Halls*

Tracks

In addition to being an obvious sign of deer presence, tracks reveal several items of interest to the keen observer. Tracks going in one direction on a trail probably indicate paths that are used infrequently. Tracks going in two directions are a sign of regular use. Irregularly spaced tracks over a broad area may indicate a feeding ground.

The size of the tracks does not necessarily indicate the deer's sex. However, usually the fawn tracks are smaller and distinguishable from those of older deer, and thus the observer can get some idea of the fawn/adult ratio. A scarcity of fawn tracks may indicate a low reproduction rate and an over-stocked range with deer in poor condition.

When a deer walks, the hind feet are placed in almost the exact spot just vacated by the front feet (figure 28). With young deer the hind foot usually overshoots so that a portion of the front-foot track is visible behind. In larger, heavier deer the front foot tip shows in the front part of the track made by the hind foot. Usually the outside toe is about ¼ inch (7 cm) longer than the inside toe. The normal stride from toe tip to toe tip is about 18 to 19 inches (46 to 48 cm), but when the deer trots, its stride is lengthened to 30 to 36 inches (76 to 91 cm). When the ground is hard, only the nails of the main toes come in contact with it; when the ground is soft, the entire surface comes into bearing; and when the ground is very soft or muddy, the dew claws are also used.

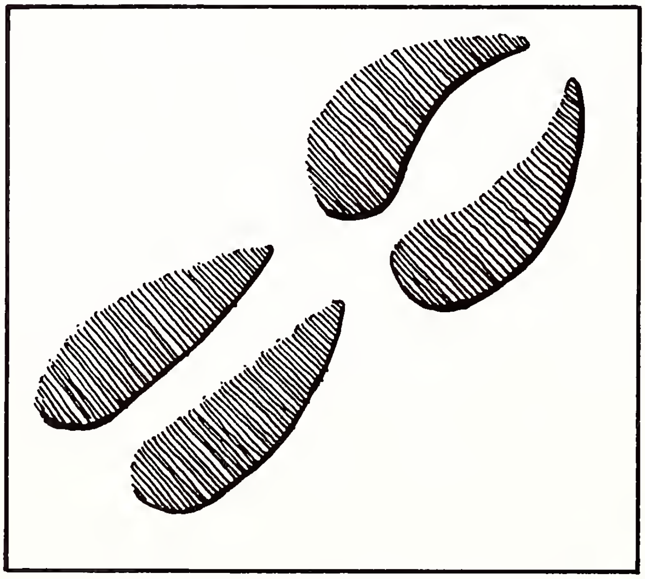

Figure 28.–Deer have a split hoof leaving tracks pointed in the front and rounded at the rear. Hogs leave a more rounded track at the front. Walking deer tracks may appear almost superimposed over each other (front and back).

In certain situations a drag mark following a track indicates a buck. After a snow of 1 inch (2.5 cm) or less a buck's foot produces a drag mark. But when snow is more than 1 inch (2.5 cm) deep, all deer leave drag marks. Drag marks also occur in sand or any surface where the deer sinks in about 1 inch (2.5 cm).

Pellets

By examining deer pellets for freshness, the observer can get some idea of when deer last used the area. Fresh pellets are black and glistening, and they have an interior softness. The time interval for them to become dry and faded in appearance and finally to disintegrate is dependent primarily on temperature and moisture conditions (see figure 46 on page 20 for comparison with rabbit pellets).

Pellets formed in late summer, fall and winter are usually well formed and compact, but in late winter and spring the feces may resemble miniature droppings of domestic livestock. Feces from deer feeding on herbaceous plants and fruit may be a loose, formless mass, but a diet of drier foods and browse results in pellets that are elongated and often pointed. In contrast, rabbit or hare feces are round.

On the average, deer defecate approximately 13 times per 24 hours. Thus, with some simple mathematics one can get a fair estimate of deer numbers. In fact, pellet counts are sometimes used to indicate population levels and trends.

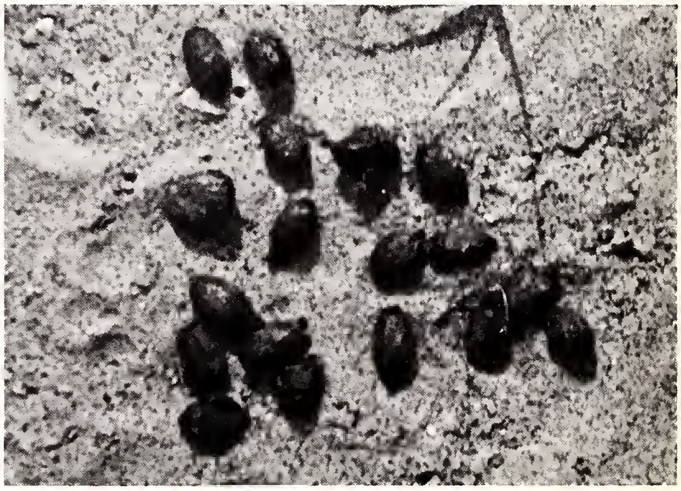

Figure 29.–Fresh deer pellets are shiny and often appear pointed and elongated. Photo: George Hurst

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*Retired. Formerly Project Leader for Wildlife Research, USDA Forest Service, Southern Forest Experiment Station, Nacogdoches, Texas.

Rubs

Along about September 1, bucks start rubbing the bark off small trees with their horns. They usually select a small tree 1 inch (2.5 cm) or so in diameter (figure 30). Trees 4 inches (10 cm) or larger are occasionally attacked, usually by the larger and heavier bucks. Small branches above each rub are broken off. Rarely is a tree used as a rub more than once. Several rubs in a small area indicate that a buck is in residence; a very fresh rub means that he is in the vicinity. Bucks appear to select trees like pine, juniper and cherry, which have certain aromatic qualities.

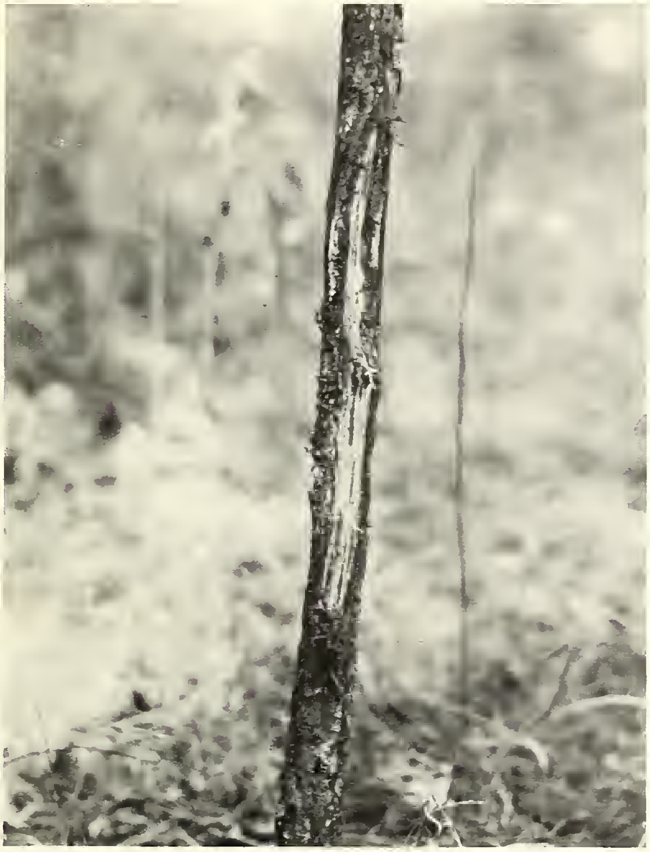


Figure 30.–Bucks rub bark from small saplings, probably to mark areas and establish dominance in preparation for breeding.

Scrapes

Scrapes are pawed-out areas on the ground about 3 feet (91 cm) across. Over a period of time and numerous visits, scrapes may be dug down as much as 3 inches (7.6 cm) below ground level. They are almost always located near a tree from which a branch overhangs at a height that can be reached by the buck (figure 31). The buck, standing over the scrape, will reach up with his nose and muzzle and pick at the branch or rip at it with his antlers. A buck will probably have several scrapes marking his domain and he will return to them time and again. Both bucks and does urinate in the scrape and use these scrapes as a means of communication during the breeding season. In fact, scraping activity closely coincides with the peak of breeding activity, usually from mid-November to the first of December.

Scrapes are usually grouped along established deer trails in fairly open woods. They may or may not be located in the same area as the rubs.

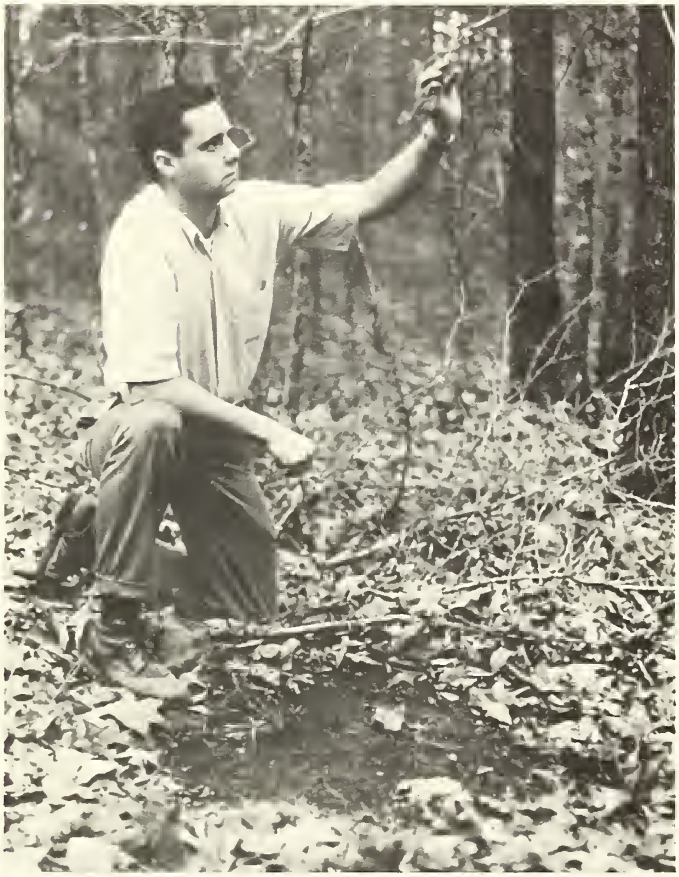


Figure 31.–Scraping apparently serves as a means of communication between bucks and does during the breeding season. Photo courtesy of R. Larry Marchinton.

Beds

In some cases deer leave no discernible trace of occupancy when they bed down; in other instances the matted-down herbaceous vegetation may be an obvious sign of recent presence. Deer seek bedding spots that seem most comfortable and safe to them. The selection may reflect a need to keep out of the wind, to keep warm or cool, to keep dry, or perhaps to avoid insects. In any case, the bedding location varies seasonally among deer and according to terrain, vegetation cover, and vagaries of the weather.

Shed Antlers

Even though the finding of shed antlers does not locate a buck, it can tell something about the herd and range condition. Large antlers with several long points on each beam indicate that the bucks were getting plenty to eat and that the range was not overstocked. On the other hand, small beams with short points indicate poor body growth and overstocked ranges. The presence of an unbranched antler (spike) is a sure sign of low herd vigor, regardless of the deer's age.

Smell

Much has been written about the whitetails' keen sense of smell, but little about the ability of a keen observer to detect the penetrating odor of musk given off by a deer through its glands. Once while walking through a pine-hardwood forest in South Carolina, my hunting companion stopped and said, "There are some deer close by; I can smell them." Within a few seconds and some 30 yards (27 m) away, up jumped three deer. I was amazed, as I had smelled nothing.

Appearance of Vegetation

A lot can be learned about the deer herd by looking at plants. In a stand of woody vegetation the presence of a browse line (a well-defined height, usually 5 to 6 feet [152 to 183 cm], to which the foliage and small twigs have largely been eliminated by feeding animals) is often spectacular evidence that there have been too many deer (or other ungulates) on the range for several years (figure 32). The presence of hedged browse plants, especially if they are unpalatable species such as pines, sweetgum and hickory is additional proof that the deer are having a hard time finding enough to eat. On the other hand, if highly palatable plants such as honeysuckle, strawberry bush and yaupon are lightly to moderately browsed, chances are good that deer have good quality food available in ample amounts, a necessity if deer are to achieve their genetic potential in body size, reproduction and antler development (figure 33a and b). It is difficult to distinguish between forage use by cattle and deer when both occupy the same range. However, in contrast to the ragged-edge appearance of browse use by deer, rabbit and hare use is easily recognized by a sharply defined cut, usually at a 45-degree angle (see figure 47, page 20).

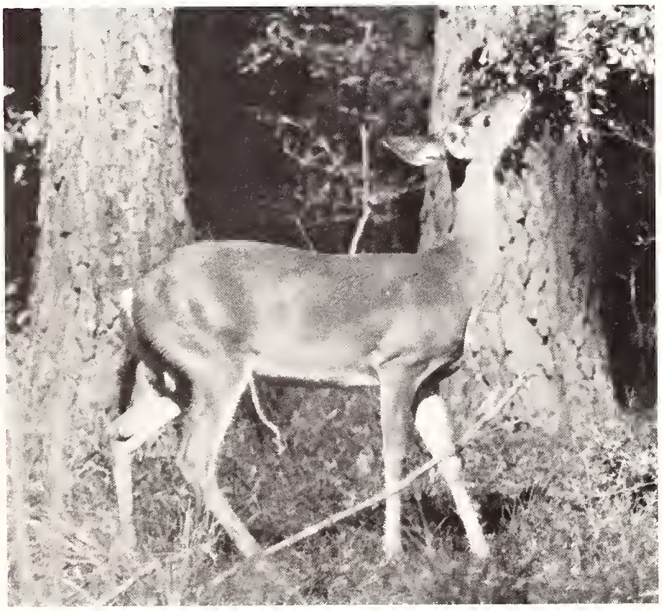
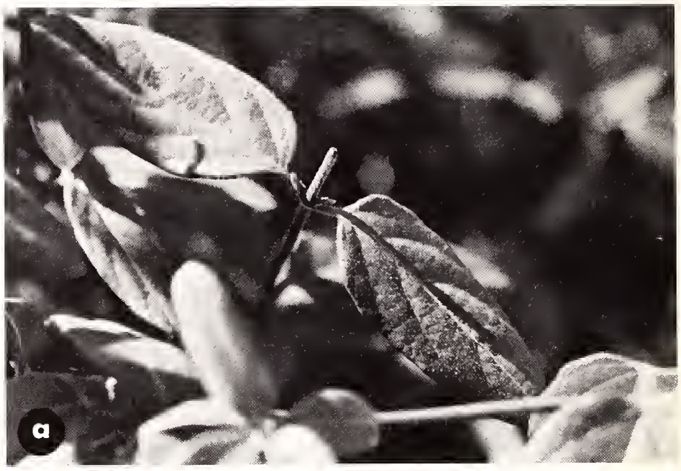


Figure 32.–Deer will often browse as high as they can reach. Browse lines can be readily detected especially in the late summer and early fall on overstocked ranges.



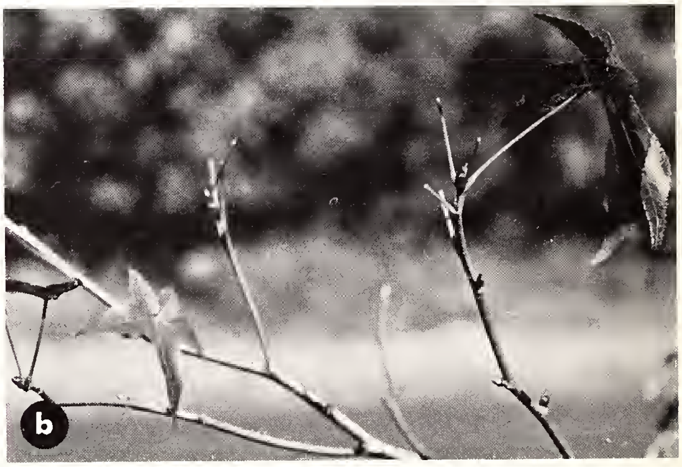


Figure 33.–(a) Light utilization of Japanese honeysuckle is a good indication that deer are getting plenty to eat, whereas (b) heavy use of sweetgum twigs indicates that palatable browse is scarce. Photos courtesy of James C. Kroll.

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SQUIRRELS, By Chester E. Billie, Jr.*

Tree squirrels have been some of the most popular game species since colonial times. The two most important species are the gray squirrel and the fox squirrel. Other common names for these species are the cat squirrel and red squirrel. They are true rodents, belonging to the order Rodentia, having two upper and two lower incisors as well as a wide space between the front incisors and premolars.

The gray and fox squirrel are closely related, with similar traits and life needs. However, the two have several differences that distinguish them physically. Gray squirrel pelage is usually gray in color, but may be melanistic (black) or albino (white). The pelage of the fox squirrel is usually reddish or rusty, but may also be melanistic or albino. The hair on a gray squirrel's tail is white tipped, whereas the hair on the tail of a fox squirrel is rusty tipped. Adult gray squirrels average about 1 pound (0.45 kg) in weight, whereas fox squirrels weigh from 1½ to 2 pounds (0.67 to 0.9 kg). Gray squirrels have a body length of 8 to 10 inches (20 to 25 cm) and a tail length of 7½ to 10 inches (19 to 25 cm). Fox squirrels have a body length of 10 to 15 inches (25 to 38 cm) and a tail length of 9 to 14 inches (23 to 36 cm).

The food habits of gray and fox squirrels are similar, as they like the same things and seek them in the same way. They are omnivorous feeders, eating a variety of items both animal and plant. Principal late fall and winter foods are nuts, particularly hickory, pecan, walnut, and oak. Of the oaks, the white oak group is preferred rather than the bitter red oaks, which contain tannin. In times of emergency, squirrels may take buds, insect larvae, roots, and tree bark. The main springtime foods include stored nuts, buds, leaves, fungi, and insect larvae.

Squirrel presence can be readily seen by signs of feeding activity. Since these animals frequently feed on mast while sitting on the lower limbs of trees, evidence of mast remnants will often be found at the base of trees or under the canopies. The repeated use of the same limbs by squirrels as feeding perches day after day will result in concentrations of broken pieces of hickory nuts, acorns, pine seeds, beech nuts, dogwood drupes, or other mast remnants on the ground. If such signs are abundant during food production seasons, there is likely a good squirrel population in the area (figure 34).

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*Wildlife Specialist, Alabama Forestry Commission, Bay Minette, Ala.

Other favorite squirrel feeding areas that can be easily observed are stumps, downed logs, or rocks. These elevated places are selected so squirrels can observe the surrounding area for possible danger while feeding. Mast remnants or broken pieces will usually be concentrated on these objects during and for a considerable time after the mast producing season (figure 35).

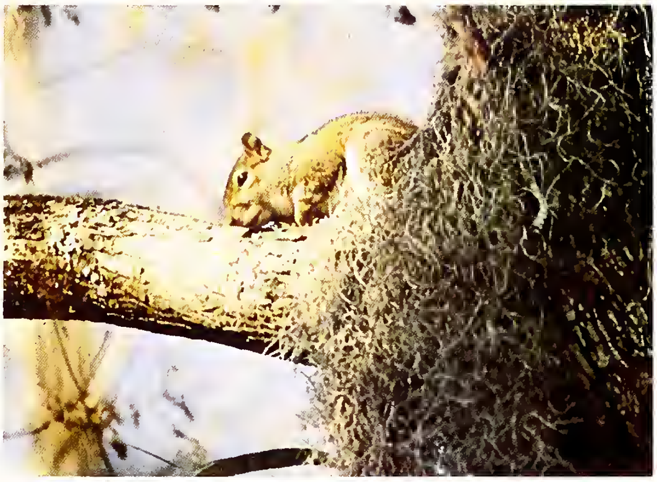

Figure 34.–Limbs next to tree boles are favorite places for feeding.

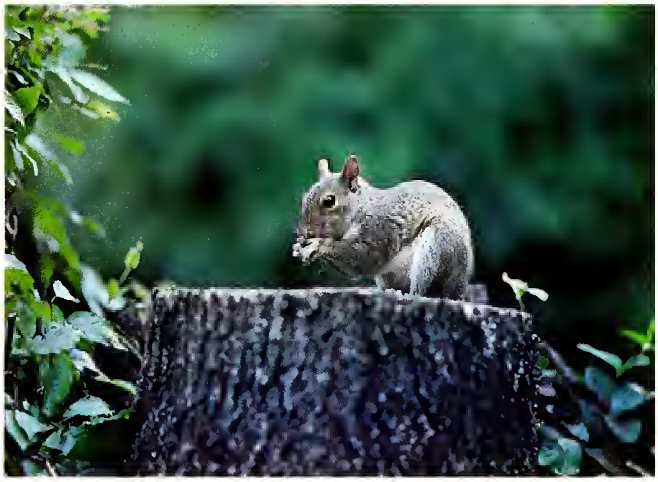

Figure 35.–Stump tops will often contain evidence of squirrel feeding.

In addition to mast, squirrels feed seasonally on buds, flowers, and occasionally on tree bark. For example, in springtime, pieces of yellow-poplar flowers can be seen under canopies whenever squirrels are present. Buds of several species of oak, red maple, and beech are eaten from late winter on into the summer. Squirrels sometimes eat the bark of selected trees. This is evidenced by complete debarking down to the cambium on portions of trunks and limbs (figure 36).

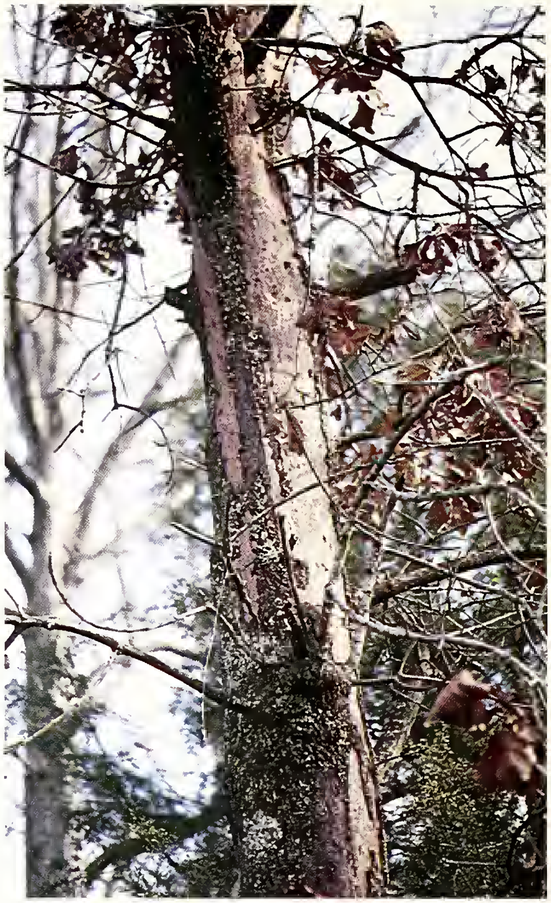

Figure 36.–Although it is not common, squirrels sometimes eat the bark of selected trees.

Tree cavities or nests are essential for good squirrel habitat. Cavities are holes in trees located usually 15 or more feet (4.5 m) above the ground level. Entrance holes are from 2½ to 3 inches (6.4 to 7.7 cm) in diameter and the cavity depth is 14 to 15 inches (36 to 38 cm). Cavities may start from limb scars or knots which allow the entrance of decay into the tree. Squirrels begin helping the process of decay by gnawing at the bark around these small decayed openings until an entrance hole is made into the bole of the tree. This process may take from a few months to several years (figure 37). Cavity construction can easily be detected by fresh gnawing signs and/or new bark growth. This same sign is seen in maintenance activity of cavity entrances as squirrels attempt to keep new bark and wood growth from closing the entrance. Cavities may be found in a variety of hardwood tree species but seldom will they be found in stands or individual trees under 30 to 35 years old (figure 38).

Leaf nests are variable in size and shape but average 12 to 14 inches (30 to 36 cm) in diameter. Nest interiors are usually constructed

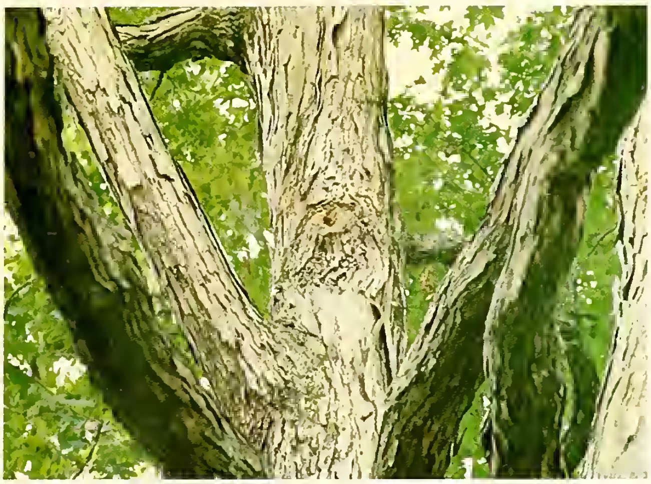

Figure 37.–This gnawed knot is the future den of a squirrel and possibly many more species of wildlife.

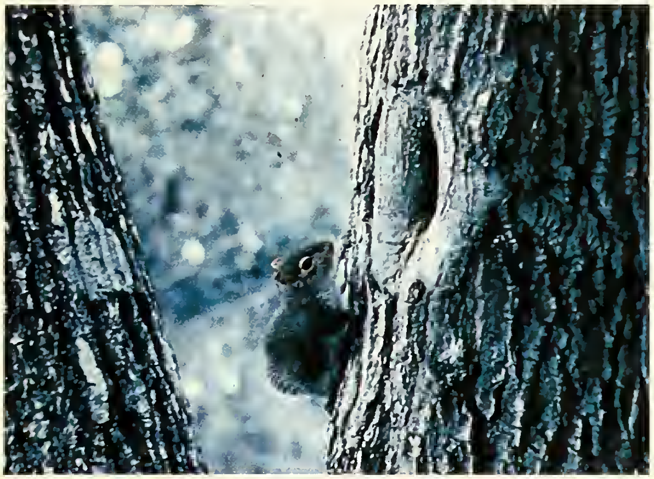

Figure 38.–Constant maintenance by gnawing is necessary to keep cavities open.

of shredded leaves and strips of bark. Easy-to-strip trees will often show signs of bark removal for nest construction (figure 39). Exteriors are composed mainly of twigs and leaves. Nests are usually a minimum of 15 feet (4.5 m) above ground level and are often found in a crotch or limb fork next to the tree bole. Live vines are often used to help anchor the nests and keep them secure in inclement weather. Tree height is a primary factor for leaf nests in contrast to tree age and diameter for cavities. Nests may be found in a wide variety of conifer and hardwood species from 4 inches (10 cm) and larger in diameter (figure 40.)

Although leaf nests verify the presence of squirrels in an area, a count of nests alone is not a good indication of squirrel populations. Some nests may be abandoned and others may be constructed by young squirrels that do not yet have the capability to reproduce. Well-constructed nests may last from one to three years, but most begin to disintegrate into a shapeless mass of twigs and leaves if not maintained.

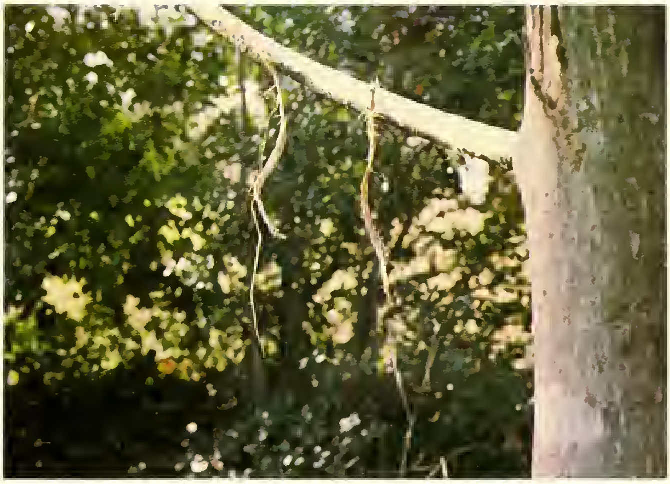

Figure 39.–This yellow-poplar limb supplied the material needed for a leaf nest.

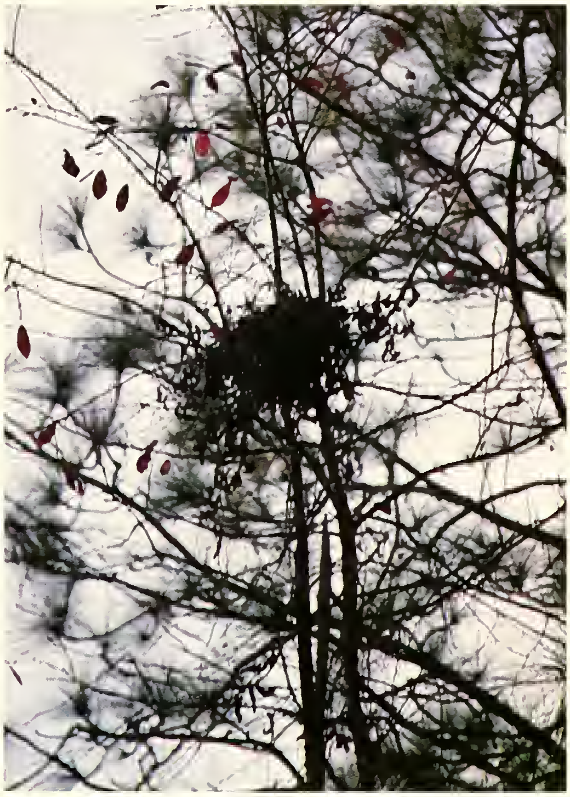

Figure 40.–Leaf nests are constructed in a variety of tree species.

Squirrels are very adept at hiding from persons walking through their habitat. However, their presence may be detected buring brief pauses during the walk by the squirrels' audible calls. These sounds vary from a low pitched mewing sound to a squeal and bark. Those nearest the observer will not usually call as loudly or frequently as those some distance from the observer. The calls are most audible in the early morning and late afternoon.

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QUAIL, DOVES, AND RABBITS [17]

by George A. Hurst*

Bobwhite Quail

Bobwhite quail inhabit open, mature (reduced basal area) pine forests that are routinely control burned, cut-over tracts, young pine plantations, old-fields, and agricultural habitat types (figure 41).

Quail nest on the ground in grass dominated habitats and usually in a clumpgrass site such as broomsedge. The nest consists of grasses, pine needles and/or other stems woven together into a compact unit. The nest usually has an arched-over top, leaving only an opening (entrance) (figure 42). Quail lay about 14 eggs, which are white, a little over an inch (2.5 cm) long, and about ⅞ of an inch (2 cm) wide. One end of the egg is much wider than the other.

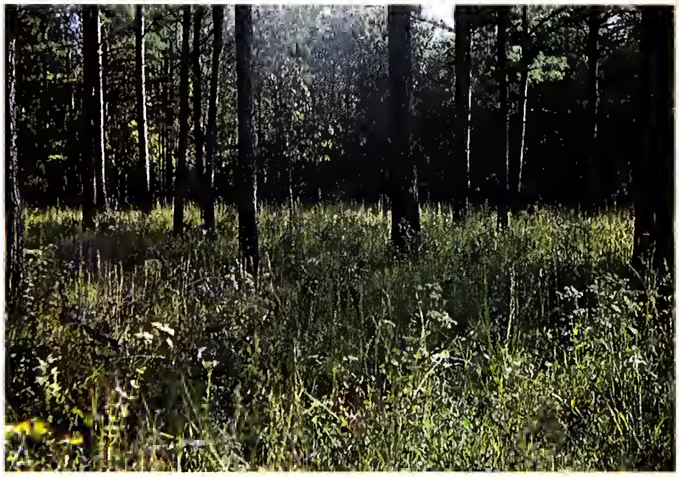

Figure 41.–Pine sawtimber overstories and grass understories make excellent quail habitat.

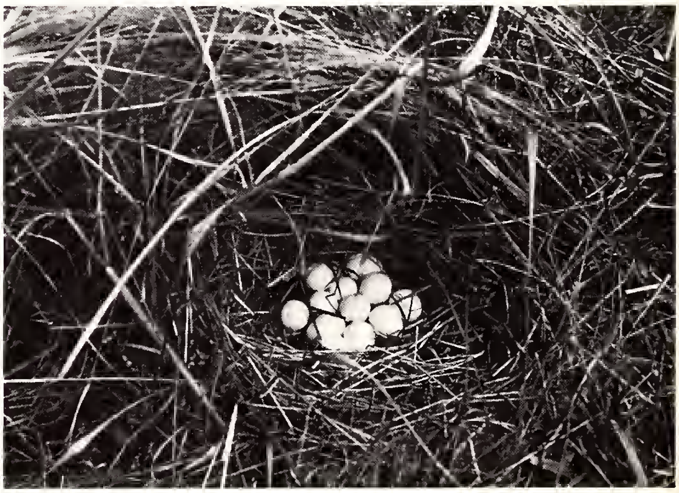

Figure 42.–Quail nests usually can only be seen through an opening at the entrance because of arched-over material covering the nest.

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*Professor, Department of Wildlife and Fisheries, Mississippi State University, Mississippi State, Miss.

Quail roost sites consist of a pile of individual droppings, often hundreds. The size of the pile of droppings is usually 5 to 6 inches (13 to 15 cm) in diameter, but varies according to the number of birds in the covey. The droppings are brownish to blackish and have a white top (urine) (figure 43).

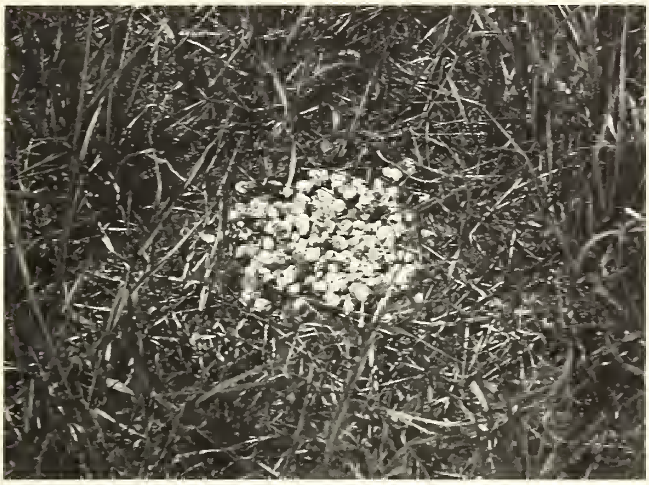


Figure 43.–Droppings indicate that a covey of quail has roosted here.

The mating call of the quail, "Bob White, AH Bob White," is commonly heard in the reproductive season, spring and summer. The scatter, covey or morning-wakeup calls, which are quite similar, "kurl-lee-he," can be heard in early morning, late evening or other times of the day.

Mourning Dove

Doves are associated with range and agricultural habitats, but they do nest and roost in open pine forests and pine plantations. Recently site-prepared tracts serve as feeding areas, and dirt roads are often used for dusting, feeding on weed seeds at the edge, and resting.

Dove nests are a flimsy, platform type and are usually not over 12 feet (3.0 m) above ground. The nest consists of various sticks, blades of grasses or pine needles. Doves nest in cedar, pine or brushy hardwood trees and from March to October in much of the South, with each nest having only two white eggs. The eggs are about 1⅛ inch (3 cm) long and ¾ inch (2 cm) wide (figure 44).

The mournful mating call . . . Cooah, cooo, cooo, cooo . . . is heard in early morning and at other times of the day.

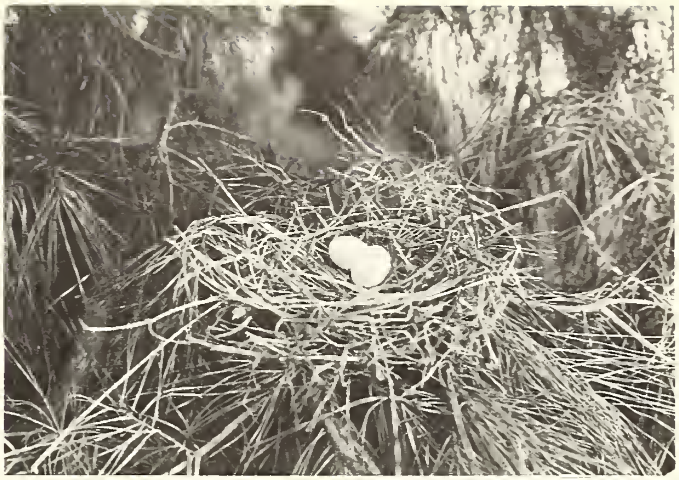


Figure 44.–Dove nests are rather flimsy, with the appearance of being hastily put together.

Cottontail Rabbit

Cottontail rabbits are associated with old fields, cutover areas, young pine plantations and mature, open, burned pine forests. Early stages of plant succession are favorite habitats.

Cottontail feeding sign is not often found, as they feed on a great variety of plants. If the rabbit has cut a woody plant the browse sign can be identified as smooth, clean and at about a 45 degree angle. Deer browse sign is different (usually) in that the cut is nearly square across and is quite rough, somewhat frayed on one edge.

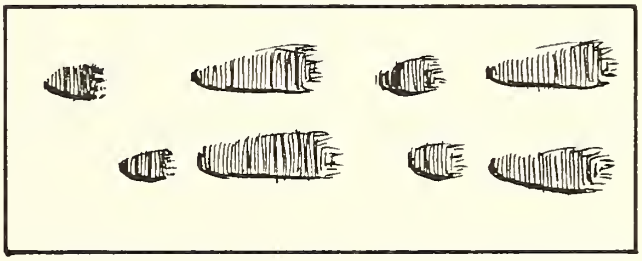


Figure 45.–Tracks of the front feet are about one third as long as the large hind feet tracks of a rabbit.

Rabbit nests are well concealed in dense grass-forb-vine areas. The nest is in a scooped-out cup, about 2 to 3 inches (5 to 7.6 cm) deep and it contains grass and rabbit fur.

Rabbit tracks are easy to identify (figure 45) and can be found in mud, wet sand and snow. Prints of the front feet are about 1 inch long (2.5 cm) and those of the hind feet 3½ inches long (9 cm). Rabbit forms (beds), runs or trails might also be noticed in dense grass-forb-vine habitats.

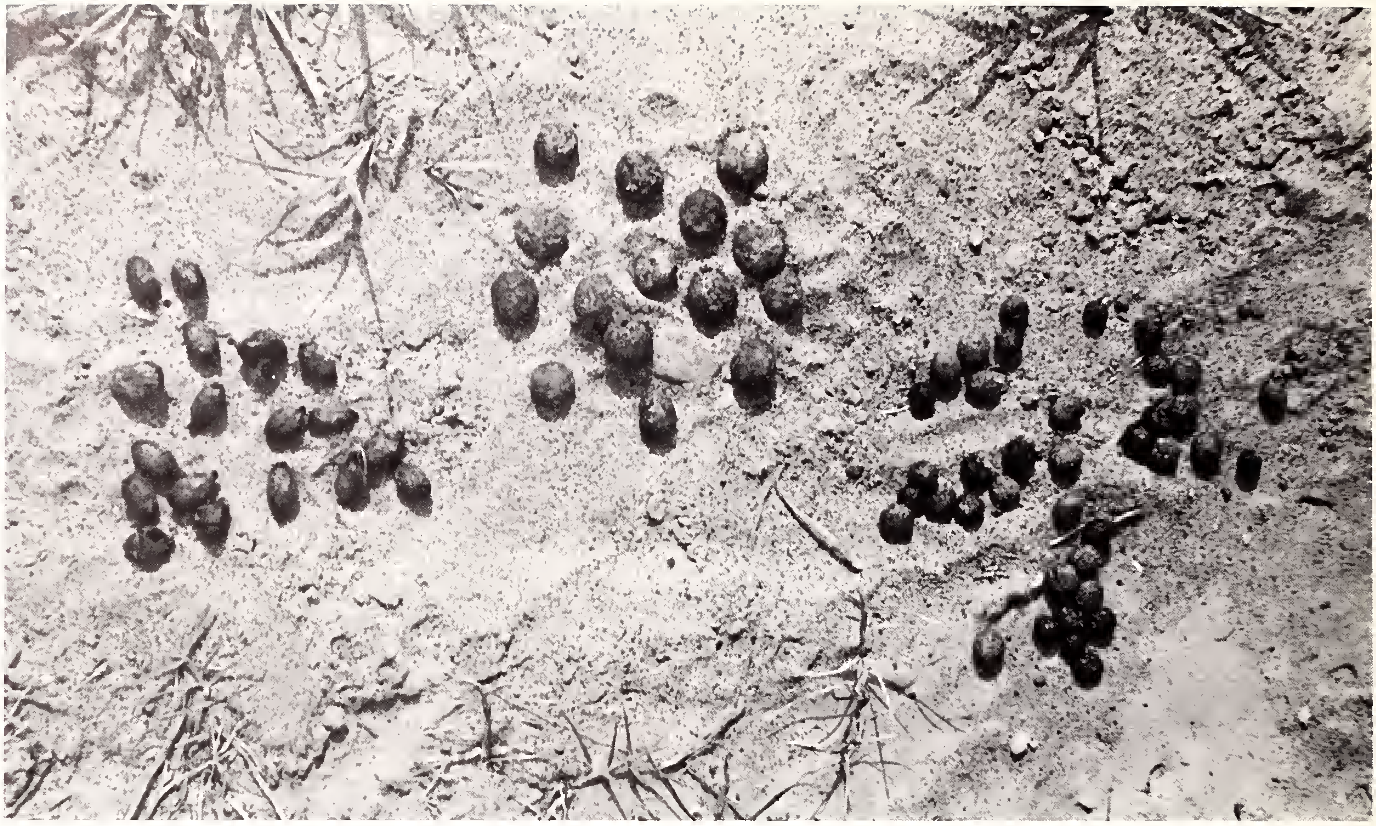


Figure 46.–White-tailed deer (left), swamp rabbit (center), and cottontail (right) rabbit droppings. Note the elongated shape of deer droppings as compared to the rounded rabbit droppings.

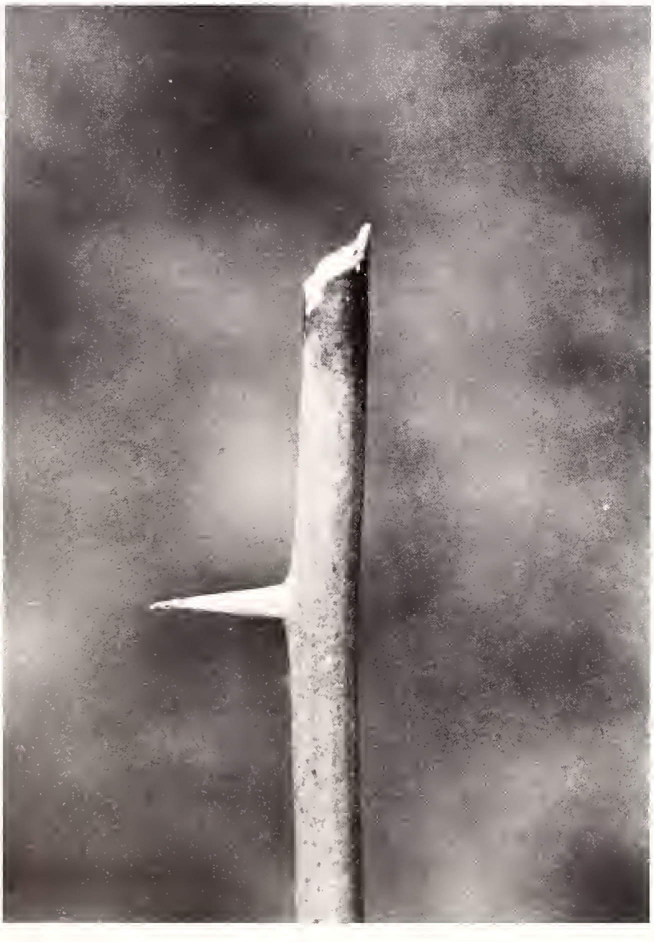


Figure 47.–Rabbit browse is indicated by a clean 45-degree angle cut whereas deer browse will have a torn appearance, and will be flat across the break.

Rabbit droppings occur in groups and are usually brownish. Cottontail droppings are about ⅜ inch (1 cm) in diameter, slightly flattened and circular, and are about ¼ inch (0.7 cm) high. Cottontail, swamp rabbit and white-tailed deer pellets (droppings) are compared in figure 46.

Swamp Rabbit

The swamp rabbit (canecutter) inhabits bottomland hardwood forests and various other wetland (lowland) habitats along creeks, streams and rivers.

Swamp rabbits cut rather large woody stems in the winter and their browse sign can readily be observed. The cut is clean and as with the cottontail, at about a 45 degree angle (figure 47).

Swamp rabbit droppings usually can be found on stumps or logs in the fall-early spring seasons. The droppings are brownish, about ½ inch (1.3 cm) in diameter, circular, but flattened from the top and about ⅜ inch (1 cm) high. Droppings from adult swamp rabbits will be larger than those from adult cottontail rabbits (figure 46).

245 47

WOODCOCK by James R. Davis*

The American woodcock is referred to in many sections of the United States as a timberdoodle, snipe, jacksnipe or other familiar terms (figure 48). It has the latin name of *Philohela minor* and bears a slight resemblance to another long-billed migratory game species, the common snipe, *Capella gallinago,* (also called Wilson's snipe as well as the above names). However, the only close similarity between the two is in appearance of the bill.

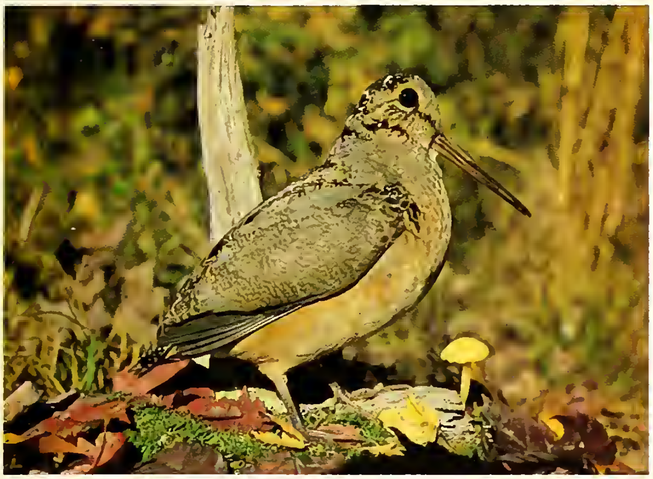


Figure 48.–The American woodcock.

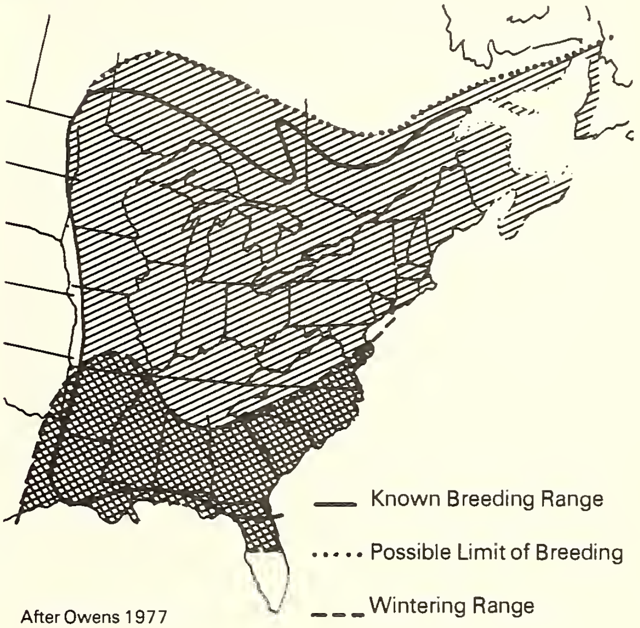
There are several reasons why the American woodcock may be described as unique: one is that the "ears" of this long-billed bird are situated in front of the eyes; a second is that the brain is positioned upside down as compared to other birds; and a third is that the upper part of the long bill (upper mandible) is hinged or at least flexible at the middle and has muscles strong enough to permit the grasping of food found while probing in the soft, moist soil of the feeding sites.

If these odd features are not considered unique, then note that the outer three primaries of the flight feathers of this game bird are so narrow (less than 0.78 inches (20 mm) total) as to be almost useless in flight. The shape of these three feathers does create a distinctive whistling noise and, during flight, this noise quickly and easily identifies the woodcock whether observed or not.

The weight, length of the bill and total width measurement of the three outer primary flight feathers are the basis for distinguishing between the sexes of the American woodcock. Otherwise, they are alike in appearance.

The female weighs more (about 8 ounces (220 g) average), has the longer bill (in excess of 2.56 inches (65 mm)) and the wider total measurement of the primary feathers, 0.47 to 0.79 inch (12 to 20 mm). In this species, the female is not the more petite.

The American woodcock winters in the deep south. It nests primarily in the north, although there are many records of nesting and of broods into Alabama. As can be seen from the map, the vast majority nest and spend the summer and early fall east of the Mississippi River northward to the vicinity of James Bay in Canada (figure 49).



After Owens 1977

Figure 49.–Southern range of the American woodcock, from American Woodcock in Management of Migratory Shore and Upland Game Birds in North America.

Daylight hours are usually spent in the dense thickets of marshy springheads and in tangles along small stream bottoms where hunting is difficult at best. These sites will often have a dense cover of Japanese honeysuckle, gallberry or titi and when the overstory of the site is open enough there will be black alder, blackberry briar, and associated species. Occasionally woodcock will be flushed from wet hillsides under pine canopies. This most commonly happens during the migration period.

Typically, the daytime feeding areas of the woodcock have light or spotted ground cover of leaves or straw. These areas are used for feeding as well as the open pastures that are used at night.

Evidence that woodcock have spent time in a location is apparent from the whitish "splats" or droppings (figure 50). Upon close examination of sites where splats are noted, there will usually

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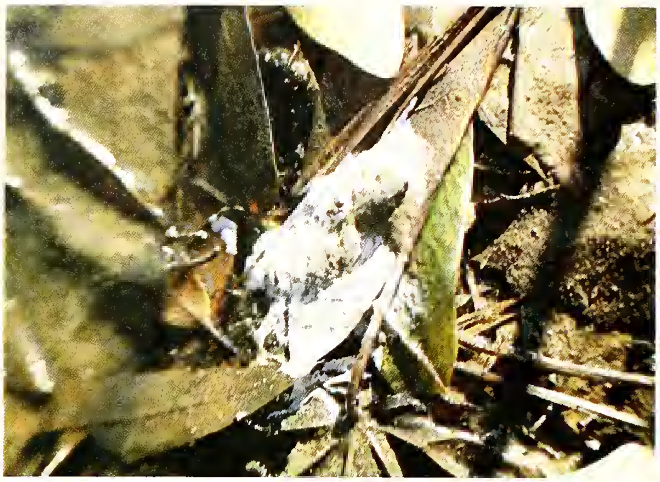

Figure 50.–The splat or dropping of woodcock.

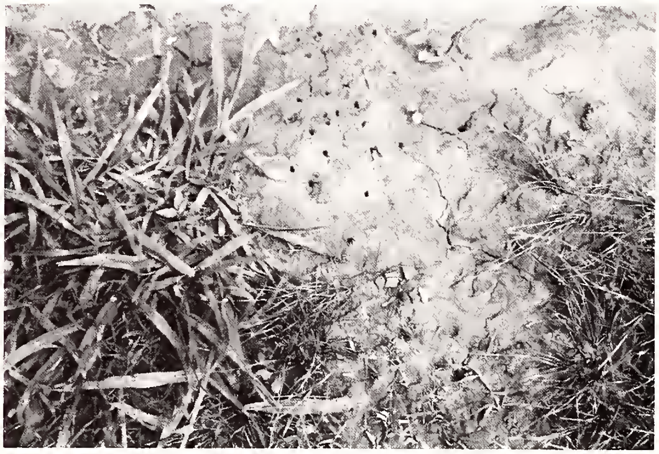

Figure 51.–Probe holes of American woodcock.

be evidence of feeding by location of probe holes. Probe holes are less noticeable than splats and are sometimes lost to the observer when ground cover is dense (figure 51).

There is, as yet, no formula to accurately predict the diurnal or daytime cover haunts of the woodcock except that these birds are always found in numbers in the moist areas with dense shrub and brush overhead cover of such species as mentioned earlier. And since woodcock are migratory, birds may be present in great numbers on one date and mostly gone on the next visit.

Woodcock spend many, perhaps most, nights in the winter range on moist, open pastures and fields, feeding, resting and sleeping. The diet of the woodcock is primarily earthworms (as much as 80 percent by volume), with the remainder mostly small insects and the larval forms of insects found in the moist habitats of the low pasturelands and fields. At night on the winter range, the woodcock moves to this food source.

In the nesting range of the woodcock and during the nesting season (which extends from early February in the south to mid-June in the north) close observation must be made or this activity will go unnoticed. Even though little effort is made to camouflage its nest, the coloration of the Woodcock makes detection difficult.

The usual nest is a cup-like depression in the ground with a few twigs about the rim. These sites have been located in almost all habitat situations, but about 90 percent will be built in some type of forest cover and in the South this will as often as not be under pine.

The usual nest will contain four eggs (figure 52).

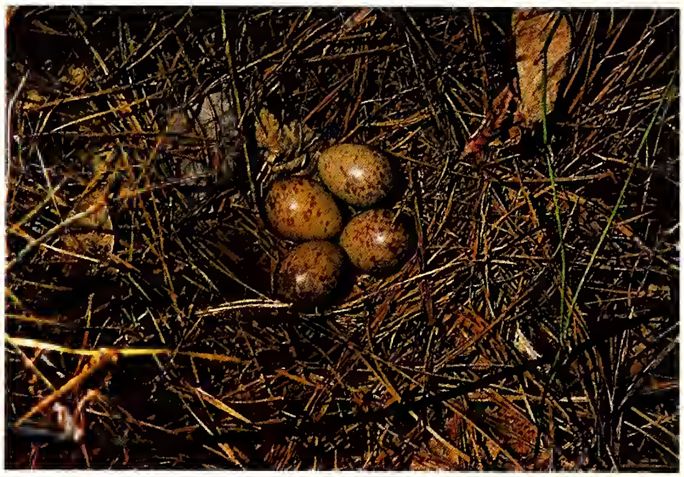

Figure 52.–Typical woodcock nest and eggs. Photo: George Hearst

The chicks, as the young are called, are mottled in color. Growth is rapid and they attain near adult size in 4 to 5 weeks. After this short period, they are almost indistinguishable from the parents. They may remain in a family group for 3 to 4 more weeks.

The hen is very adept at pulling the "broken wing" act to try to lure a threatening agent away from the chicks. When this is noted, the observer can be certain that chicks are about.

Things which indicate the presence of woodcock include:

A. A brown bird that flushes vertically 8 to 12 feet (2.1 to 3.6 m) before beginning relatively level flight.
B. A distinctive whistling noise created by the narrow flight feathers of the wings as a brown, long-billed bird flushes.
C. The whitish splats and probe holes which indicate resting and feeding. Often probing will be noted along little traveled woods roads.
D. The erratic, dodging flight of a long-billed bird at dawn and dusk. Whistling noises of the wings are usually audible.

E. The location of a ground nest with four cinnamon-colored eggs covered with brown spots and/or splotches. Eggs are about the size of the thumb to the first knuckle.

F. The "broken wing" act from a long-billed brown bird.

There are several good references on the American woodcock. Listed in the bibliography are two that offer good coverage.

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1977. American woodcock in management of migratory shore and upland game birds in North America. Edited by Glen C. Sanderson. The International Association of Fish and Wildlife Agencies, Washington, D.C. p. 149-186.

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CAVITY NESTING BIRDS

by James G. Dickson and Richard N. Conner*

A wide variety of over 30 species of birds in southern forests use cavities in trees for nesting and roosting. A high demand for cavities is also reflected by the many other vertebrates and invertebrates that also use cavities. Woodpeckers are primary cavity nesters, or "pathfinders" for other cavity nesters. As they excavate several new cavities each year, they provide the bulk of cavities used by all other cavity nesting wildlife. Some natural cavities are formed by wind and weathering of trees, but these are few. Cavity trees selected by woodpeckers typically have some decayed heartwood and often decayed sapwood too. Numerous small chips of soft decayed wood at the base of a tree or snag are a good sign that a cavity has been recently hollowed out (figures 53 and 54).

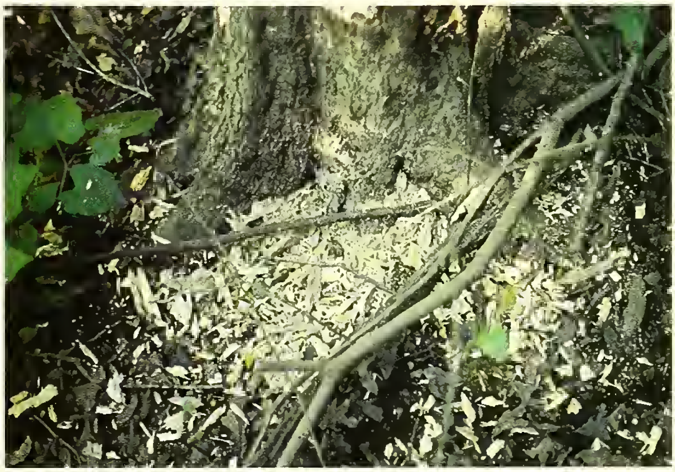

Figure 53.–Chips from woodpecker excavations

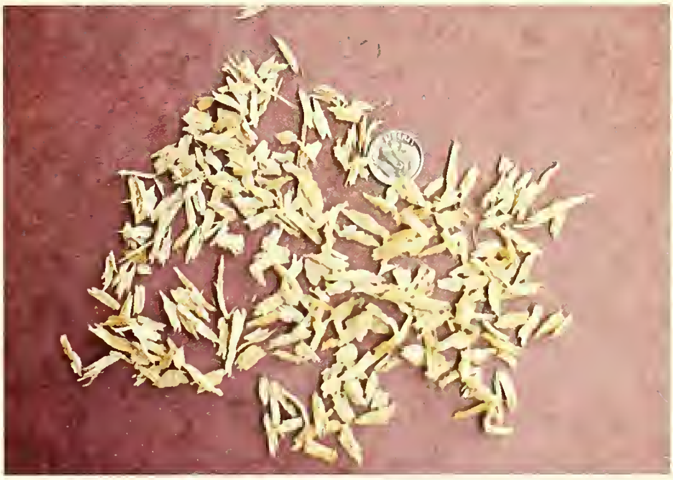

Figure 54.–Excavated chips from red-headed woodpecker cavity.

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Pileateds (figure 55) are the largest woodpeckers in North America, requiring large trees for their up to 1½ foot (46 cm) deep nests (figure 56). Their vertically eliptical nest entrances, usually 4¼ x 3½ inches (11 x 9 cm) in size and 30 to 35 feet (9 to 10.7 m) up, are much larger than those made by other woodpeckers. The typical pileated nest tree is a dead snag about 40 feet (12 m) or more in height with the top broken off (figure 57).

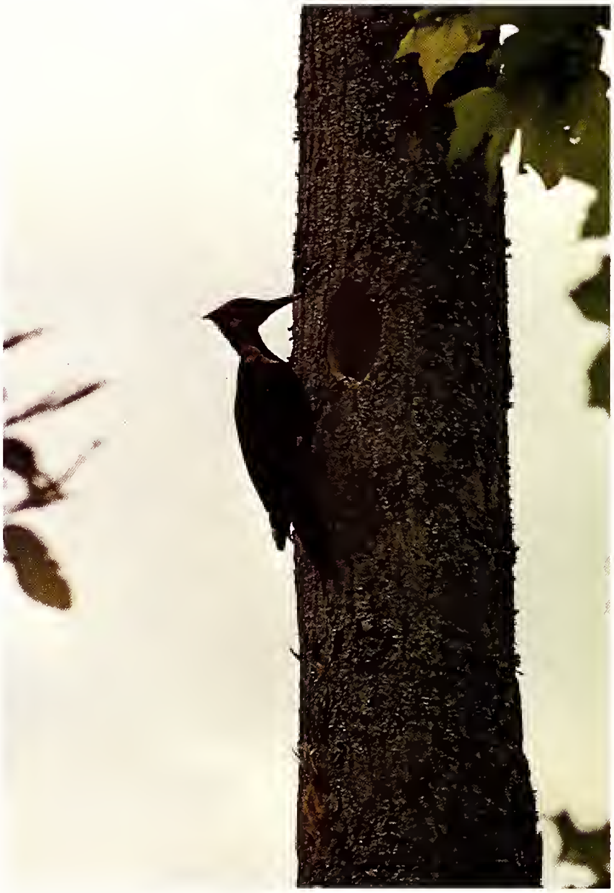

Figure 55.–Pileated woodpecker.

While other woodpeckers are more variable in their selection of nest trees than pileateds, their nest entrance sizes are fairly consistent. Downy (figure 58) and hairy (figure 59) woodpeckers have very circular nest entrances about 1¼ and 2 inches (3.2 and 5.1 cm) in diameter, respectively. While downy cavities are about 7 inches (18 cm) deep (figure 60), hairies are typically 11 to 12 inches (28 to 30 cm) in depth (figure 61). Both woodpeckers nest frequently in tops of old dead snags, but downies seem to prefer these sites more than hairies.

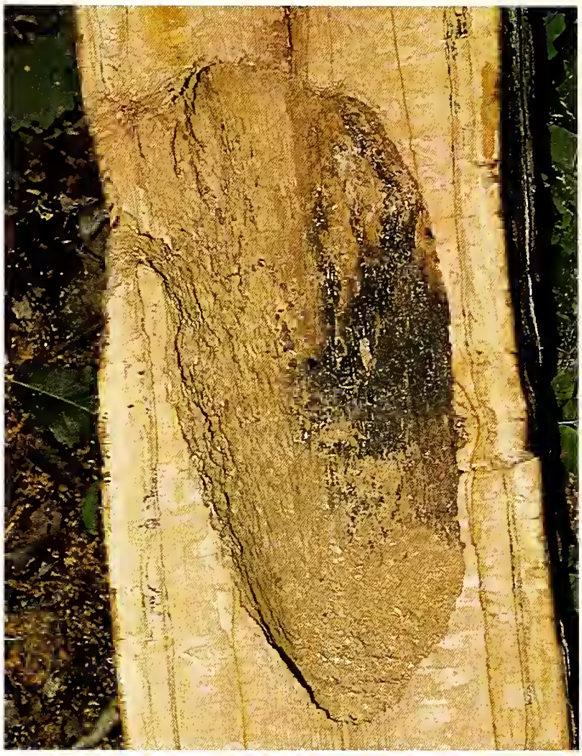

Figure 56.–Sectioned pileated woodpecker cavity.

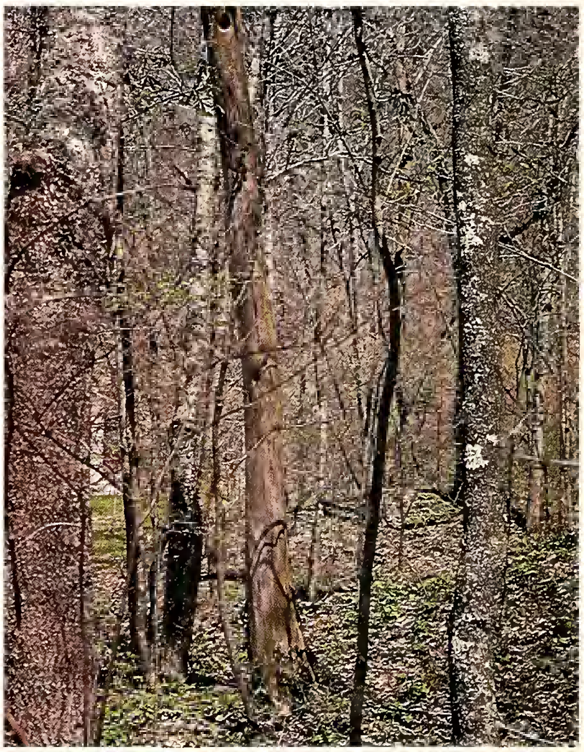

Figure 57.–Pileated woodpecker nest cavity tree.

Red-bellied woodpeckers usually nest in areas where mast-producing deciduous trees are present. These woodpeckers favor moist sites and usually select dead limbs of live trees as places to excavate cavities. Their nest entrances are quite oval as with pileateds, but smaller (about 1¾ x 2½ inches; 4.5 x 6.4 cm) and horizontally eliptical.

Common flickers (figure 62) and red-headed woodpeckers (figure 63) nest in trees near open areas. Both of these birds prefer dead snags for nest sites but will use dead portions of live trees. Flickers often nest in abandoned cavities of other woodpeckers if large enough. Entrances to flicker nests are about 3 inches in diameter while red-heads are about 2¼ inches (5.7 cm) in diameter. Fungal "conks" often fruit on the bark of flicker and other woodpecker nest trees (figure 64).

Red-cockaded woodpeckers (figure 65) nest in living pines and have very distinctive cavity trees. Since these woodpeckers peck "gum or resin wells" around the entrances and up and down the entrance side of the cavity trees, pine gum oozes out and runs down the sides of the trees. It is believed that the pine gum prevents black rat snakes from getting into the cavity to prey on young or eggs. After several years of

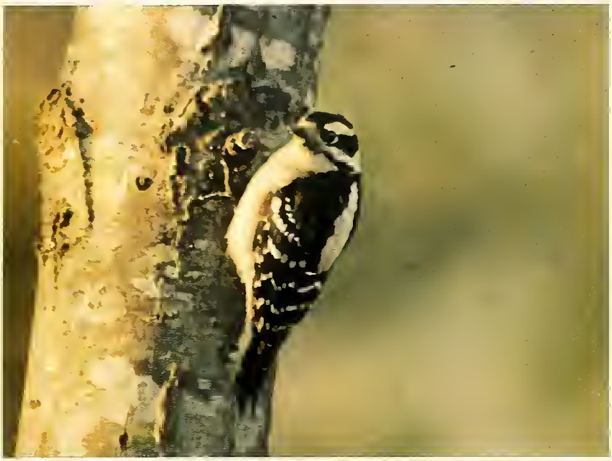
Figure 58.–Downy woodpecker.

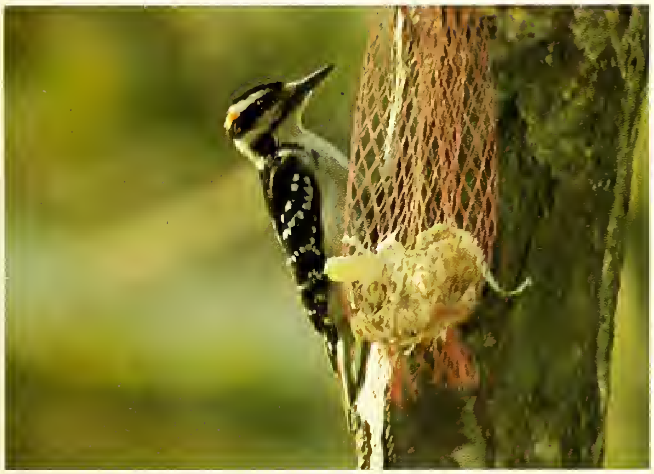
Figure 59.–Hairy woodpecker.

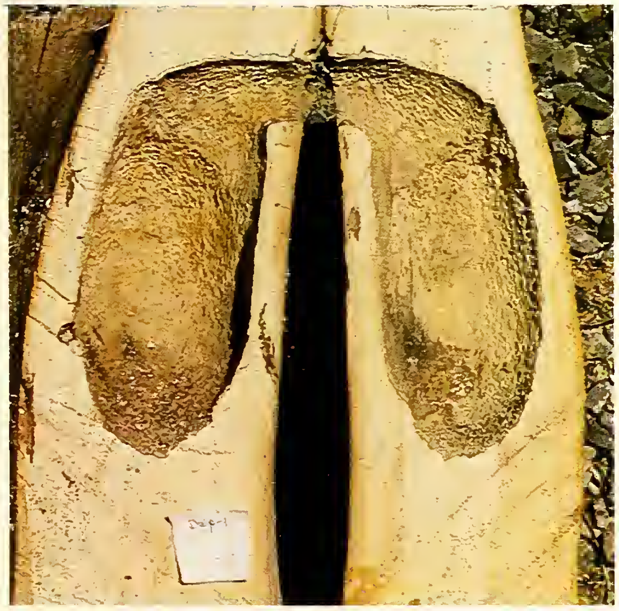
Figure 60.–Sectioned downy woodpecker cavity.

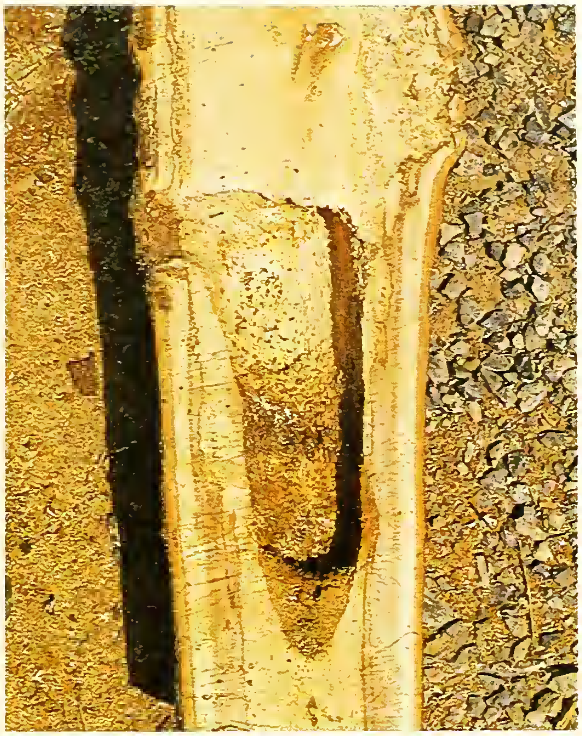
Figure 61.–Sectioned hairy woodpecker cavity.

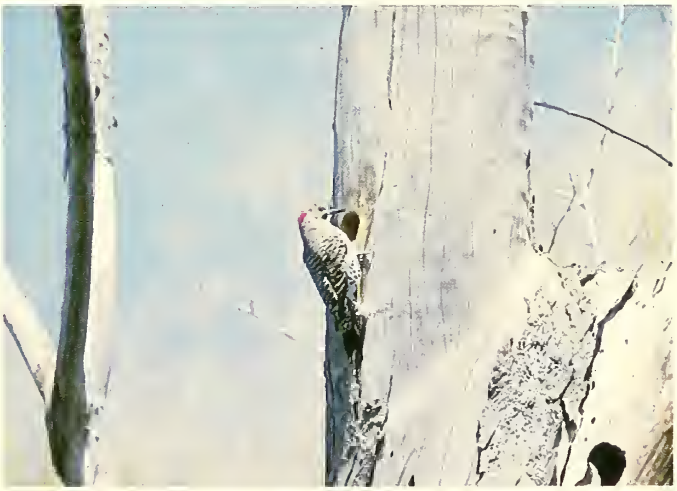
Figure 62.–Common flicker at nest cavity.

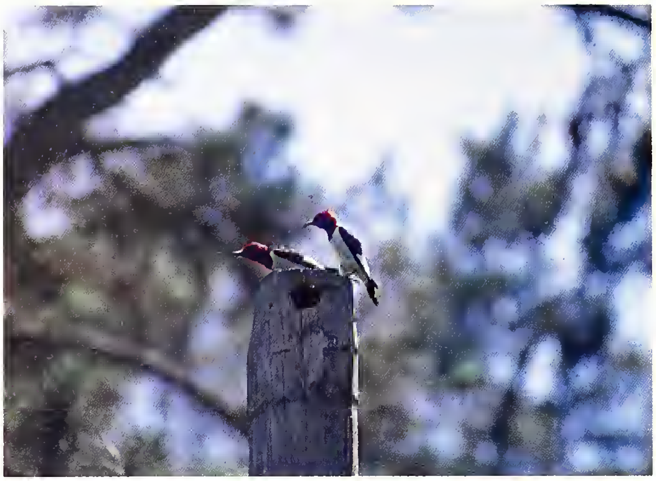

Figure 63.–Red-headed woodpeckers at nest cavity in pole.

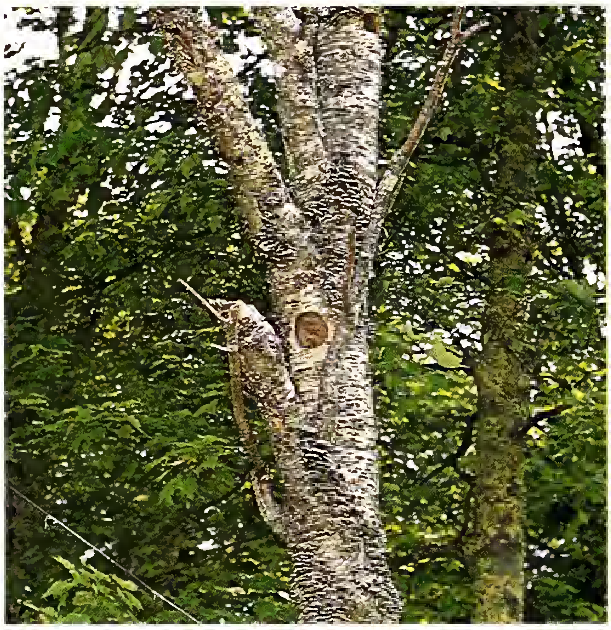

Figure 64.–Common flicker cavity tree infected with fungus, Daedalia unicolor.

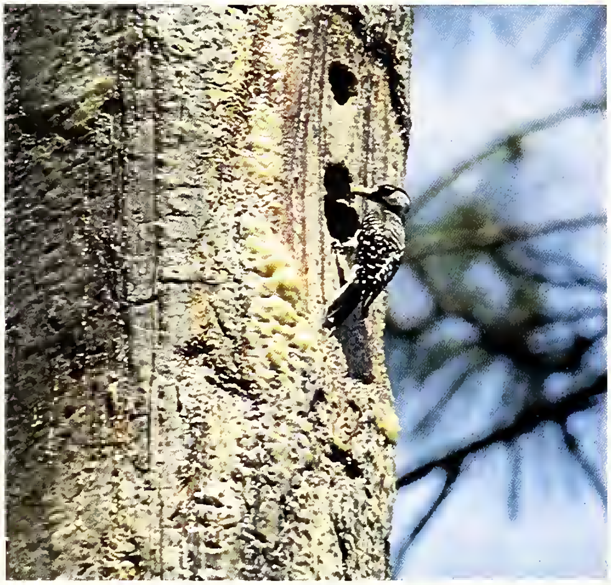

Figure 65.–Red-cockaded woodpecker at its nest cavity.

pecking gum wells around the cavity entrance, a plate like formation develops around the entrance where cambium has been removed, often up to 9 inches (23 cm) in diameter (figure 66). Cavity trees are typically located in open, old growth pine forests and are often "flat-top" relict trees passed over during timber harvests in the past. Red-cockaded trees are usually infected with red heart fungus and occasionally have the cinnamon colored "conks" or fruiting bodies of the fungus on the bark near nest cavities (figure 67). The general reddish color of red-cockaded cavity trees is caused by the woodpecker's habit of scaling loose bark off the tree's bole below the crown. The resulting smooth surface on the tree probably makes climbing more difficult for snakes.

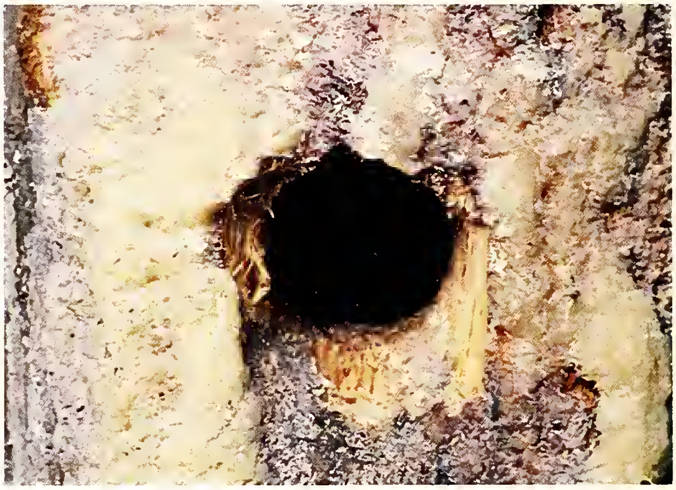

Figure 66.–Old pine gum around red-cockaded woodpecker nest cavity entrance.

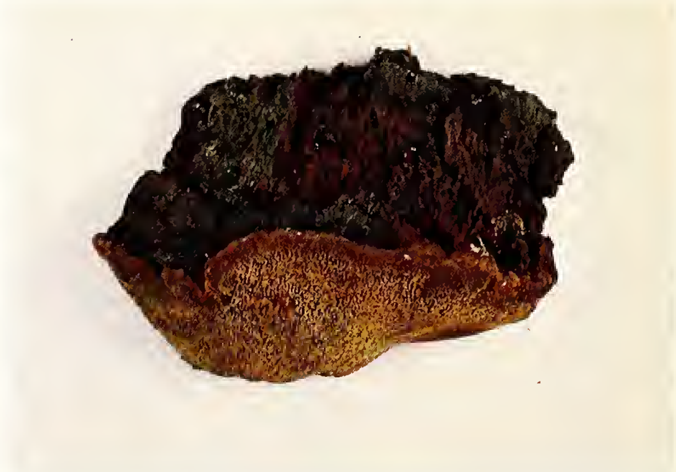

*Figure 67.–Conk of red heart fungus (*Phellinus pini*).*

Secondary Cavity Nesters

Secondary cavity nesters use abandoned cavities of woodpeckers and other cavities. Wood ducks and hooded mergansers are beautiful waterfowl that require large tree cavities for nesting. The carrion-eating black and turkey vultures are too large to use woodpecker cavities and they nest near the ground, often in cavities made by rock formations or hollow tree stumps.

Some birds of prey nest and roost in cavities. Two small falcons, the merlin and American kestrel, often nest in abandoned woodpecker cavities. While barn owls prefer old man-made structures such as barns and silos, screech and barred owls normally select tree cavities as nest and roost sites. Screech owls have a preference for pileated nest cavities (figure 68).

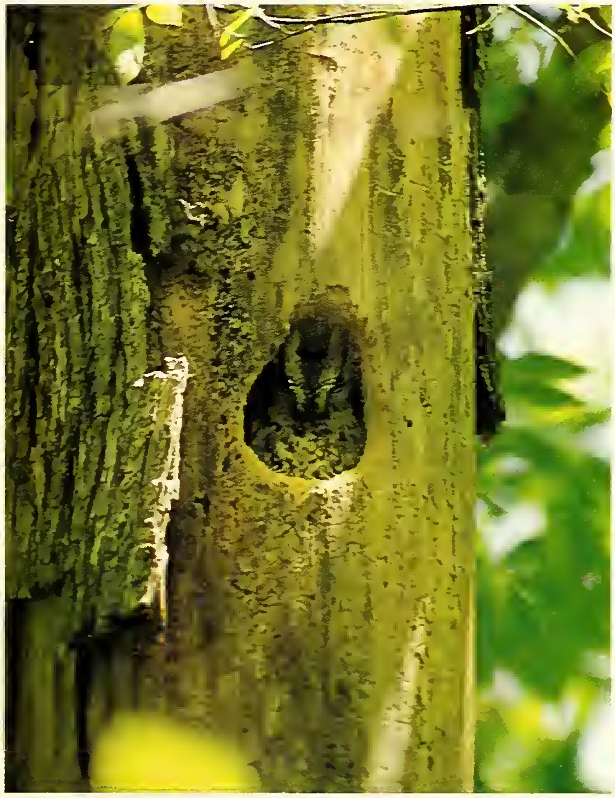

Figure 68.–Screech owl inside pileated woodpecker nest cavity.

The aptly named chimney swifts, which once nested in hollow trees, now usually glue their stick nests together with saliva on the inside of chimneys. Purple martins have adapted well to the miniature apartment houses placed in yards for them (figure 69), while tree swallows usually nest in natural cavities or old woodpecker cavities near water. Great-crested flycatchers nest in any cavity they can find, usually around forest edges.

Black-capped and Carolina chickadees use small woodpecker cavities or excavate their own if the wood is soft enough. Tufted titmice use abandoned woodpecker holes or natural cavities in forest stands. The nuthatches of southern forests, white-breasted, red-breasted, and brown-headed, usually nest in natural cavities or make their own cavities.

Nesting wrens in the south, house, Bewicks, and Carolina, nest near the ground in oven-shaped nests of grass and leaves often located in man-made structures. Eastern bluebirds nest in natural or old woodpecker cavities, and in nest boxes provided for them. Two introduced pest species, the starling and English sparrow, usually nest in man-made structures, but compete with native birds. The beautiful prothonotary warbler nests in small snags near or over water. These brightly colored warblers usually build their nests in an old nest cavity or in a bark cavity where the bark of a snag has pulled away from the trunk.

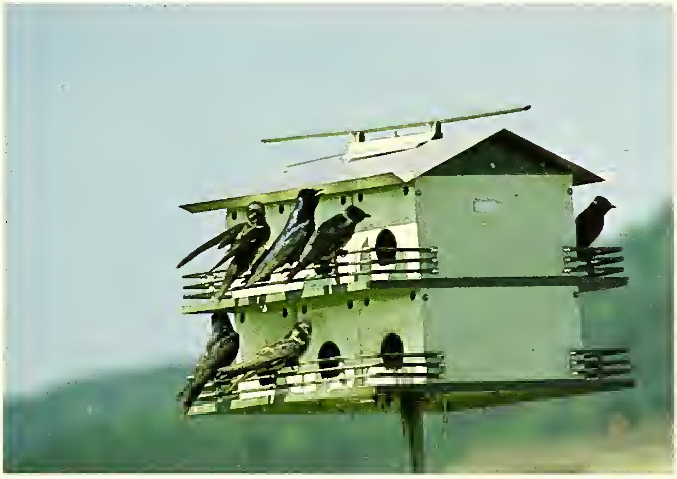

Figure 69.–Purple martin house.

Signs of Feeding

It is rare that bark on trees falls to the ground solely because of gravity. On both live and dead trees woodpeckers regularly scan and chip or scale off loose bark in search of invertebrate prey (figure 70). While all woodpeckers scale bark in search of prey, pileateds do this most intensively, followed by downies, hairies, and red-bellies. On a 40 foot (12 m) dead snag where the bark is not too firmly attached a pileated can remove all the bark and much of the sapwood within half an hour, leaving bark and debris scattered all over the ground at the tree's base. Close examination of the trunk of such trees will reveal many small horizontal gouge marks where the woodpecker's chisel-like bill has chipped off the bark. While chisel marks from pileateds are about ⅛th of an inch (0.3 cm) wide, those of hairies and downies will be less than $\frac{1}{16}$ of an inch (0.16 cm).

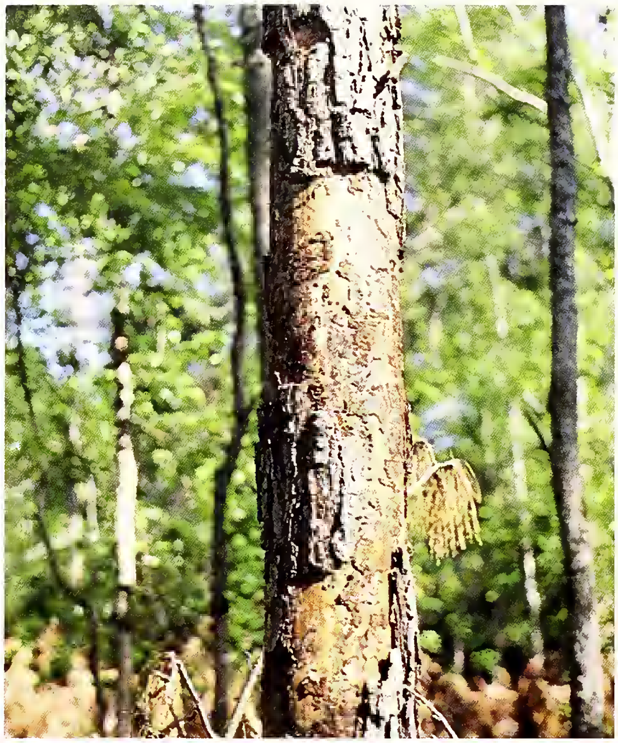

Figure 70.–Bark from dead pine tree removed by feeding woodpeckers.

Unless closely examined, holes excavated by woodpeckers while searching for insects can be confused with nest cavity entrances. When feeding, downy and hairy woodpeckers typically excavate square to round holes that are normally at a maximum of 1 and 2 inches (2.5 and 5.1 cm) deep, respectively (figure 71). The woodpeckers make these holes when pursuing flat and round headed borer larvae (Buprestidae and Cerambycidae) (figure 72). Pileated woodpeckers have the greatest prowess as excavators and regularly make 2½ to 4 inch (6.4 to 10.2 cm) deep rectangular caverns in living trees (figure 73). These holes are often 3 inches (7.6 cm) wide and 6 inches (15.2 cm) high, with several on the side of a tree trunk, and they give the large woodpecker access to carpenter ant (Hymenoptera) and termite (Isoptera) colonies where they gorge themselves on adults and pupae. The ground beneath such excavation sites is covered with wood debris.

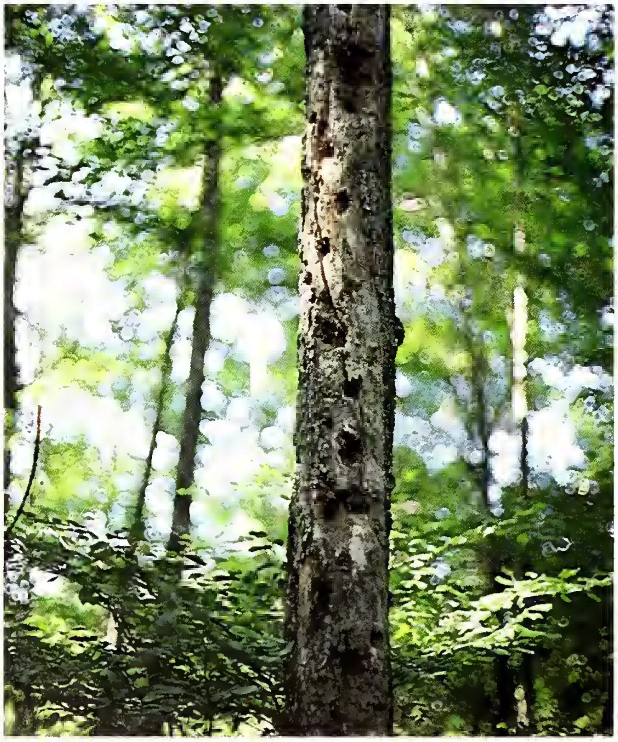

Figure 71.–Feeding excavations of woodpeckers.

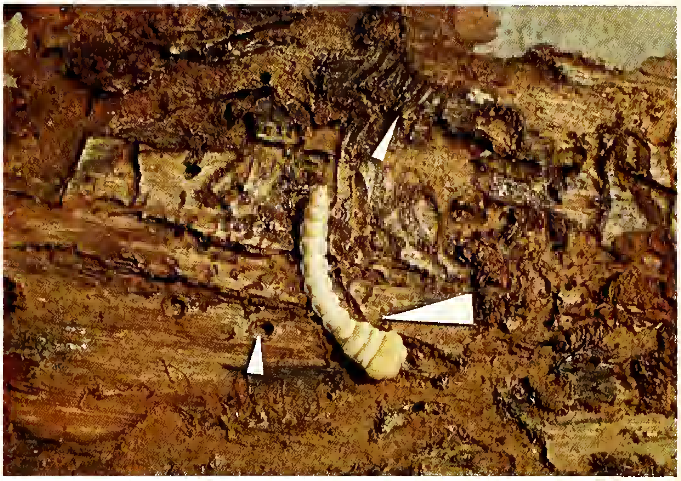

Figure 72.–Woodpecker prey: flat headed borer larvae.

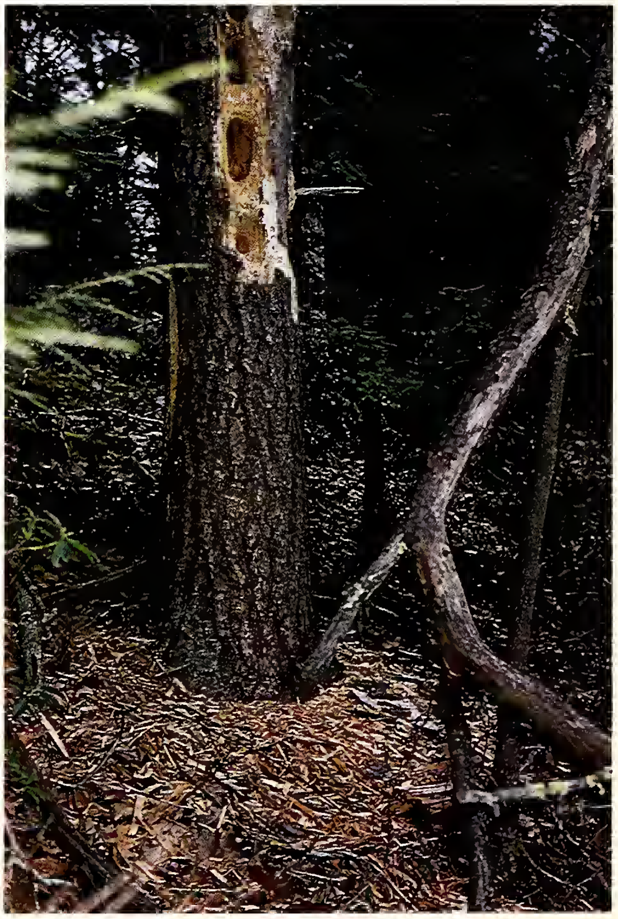

Figure 73.–Foraging site of pileated woodpecker.

Not so obvious are the bands and rows of ¼ inch (0.6 cm) diameter holes made by yellow-bellied sapsuckers (figure 74). Sapsuckers, which nest in the northern states, winter in the south and feed by pecking numerous small holes into the cambium layer of pines and hardwoods (figure 75). There they feed on the succulent inner bark and sap exuded from the "sap wells" as well as the insects, mainly ants, that are attracted to the sap. Other species of woodpeckers, warblers, and squirrels also visit the wells to drink sap and feed on insects.

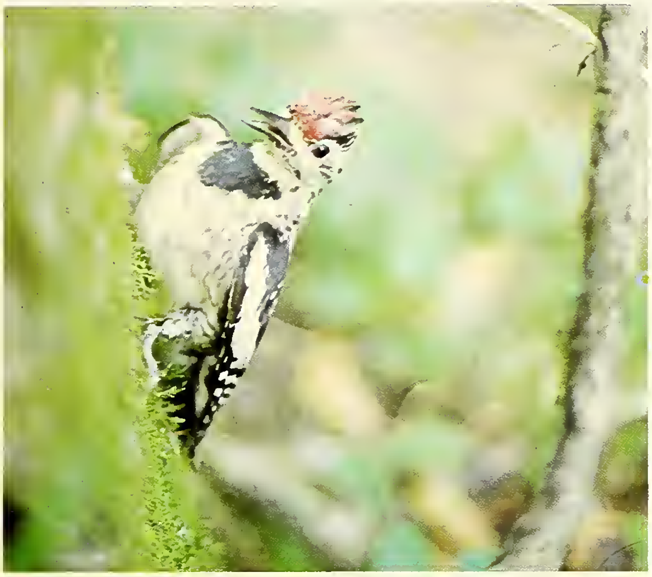

Figure 74.–Yellow-bellied sapsucker.

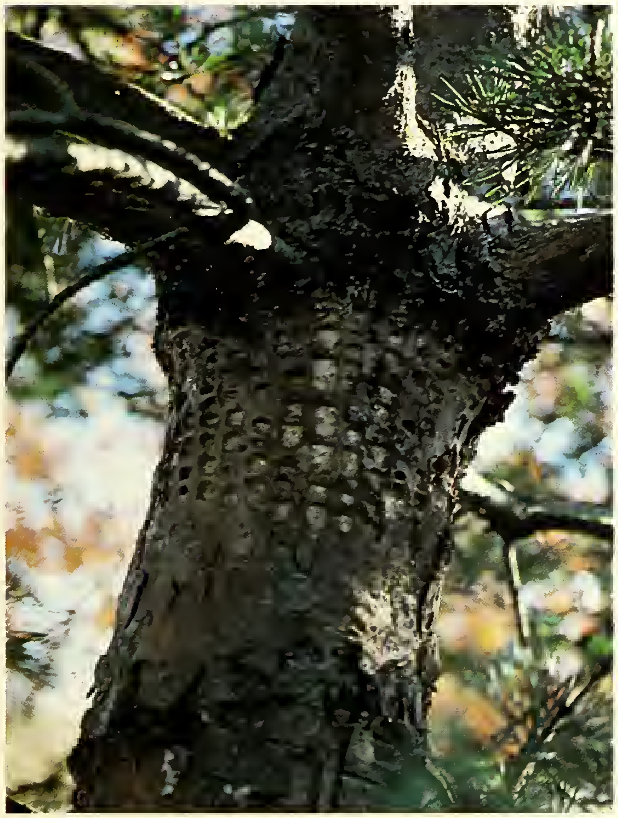

Figure 75.–Rows of sapsucker sap wells.

Almost unnoticed are the numerous peck marks made on tree bark as woodpeckers climb the trunk of trees and "percuss" the surface, using resonance of the blow to indicate presence of insects hidden in small caverns beneath the bark. Close examination will reveal the peck marks to be 1/16 to ⅛ inch (0.16 to 0.3 cm) high and not much wider than a hair.

Sounds of Cavity Nesting Birds

During late winter and spring woodpeckers announce their territories by "drumming." This rapid pecking or rapping also serves to attract mates and is usually done on very dry resonant wood that amplifies the sound. Many a late sleeper has been awakened by common flicker drumming on the metal rain gutters of their house.

A keen ear is needed to recognize the differences between species. The pileated's drum is loud, lasts several seconds, and becomes softer as it "trails off." Downy woodpeckers drum with a series of rapid one-second bursts, with up to 30 seconds between each drum. Sapsuckers have an irregular beat to their drum.

Often confused with drumming are the variety of tapping sounds made by woodpeckers, chickadees, and nuthatches as they forage on tree trunks or excavate a nest cavity. Typically these "taps" are not in rapid succession and always have an irregular rhythm.

Perhaps the most striking call of a woodpecker is the pileated's alarm call. The call consists of 10 to 15 "kuks" increasing in pitch and volume over the first third of the call and decreasing in both during the last third. Often the calling bird's mate will answer with the same call. Pileateds also string a series of the "kuk" sounds together, but give them with irregular intervals between "kuks" for sometimes up to several minutes at a time. It is thought that this call serves to tell the bird's mate of its position as it moves through the forest.

Common flickers also make a "kuk" sound quite similar to pileateds, but they are always at the same pitch and volume, have a regular pulse, and will last for up to 40 seconds. These calls are associated with territorial behavior.

Both downy and hairy woodpeckers give a "peek" call when alarmed or excited. However, the hairies' "peek" is a bit harsher in quality than the downies'. Red-bellied and red-headed woodpeckers have a call that sounds similar to "churr," or "quirr." Red-bellies and hairies both have a "rattle-like" call they give when excited.

Many woodpeckers have a relatively soft "wicka-wicka" call they give during greeting ceremonies and courtship of pairs. While the common flicker is best identified with this call, red-bellies, hairies, and even pileateds give a similar sound during pair interactions. Occasionally, the "wicka" call is given for up to 15 seconds.

Another familiar call is the chickadee saying its name, "chickadee dee dee." These sounds are most frequently heard during the winter along with the "yank, yank" sounds given by nuthatches. Chickadees, nuthatches, and titmice regularly form mixed-species flocks during the winter. Other secondary cavity nesters emit a variety of sounds which aid in identification and add another pleasurable dimension to being in the woods.

Tracks of Feet and Flight

Rare indeed is the lucky individual who finds the ravaged ant colony where an unknown assailant has had a meal. Close examination of the ground may reveal the zygodactylus (2 toes forward, 2 toes backward) toe prints of the common flicker. Rarer yet are the zygodactylus prints of the pileated as he attacks a tree stump in the snow to feed on dormant carpenter ants.

Characteristic of all woodpeckers is their flight path. These birds have an undulating flight because they fold their wings up between wing beats, causing them to descend in a gentle arc until they beat their wings again to gain altitude. This flight pattern appears to be very appropriate for "swooping" around trees in a forest.

Learning the Signs

Perhaps the best way to learn the signs of cavity nesting birds is to be in the woods with binoculars in hand, and ears and eyes alert. By becoming familiar with visual and auditory signs made by birds one can more fully appreciate the myriad of wildlife that dwells in the forest. A good fieldguide can help identify birds. Several records of bird songs and calls are also available to help narrow down the often "elusive" sounds heard.

THE RAPTORS OR BIRDS OF PREY [1-5]

by Malcolm G. Edwards*

The groups of birds known as raptors includes the hawks, owls, eagles and vultures. Of these birds, the Mississippi and Everglades kites are rarely seen. Other raptors which are occasional visitors to the South are the saw-whet and burrowing owls, the goshawk, the merlin and the peregrine falcon. The following lists the birds commonly encountered in the South:

1 **Owls**

Screech owl
Great horned owl
Barred owl
Barn owl

3 **Vultures**

Turkey vulture
Black vulture

2 **Hawks**

Cooper's hawk
Sharpshinned hawk
Broad-winged hawk
Red-shouldered hawk
Red-tailed hawk
American kestrel
Marsh hawk

4 **Eagles**

Bald eagle
Golden eagle

Fish hawk

Osprey

Some hawks are conspicuous and easily seen. The redtail is a large, white-breasted bird often seen perched along fields or interstate highways or sailing in lazy circles as it rides the thermals searching for rabbits and small rodents. The red-shouldered hawk feeds on snakes and frogs, and will usually be seen along streams and swampy areas. The broadwing is a crow-sized bird and may be encountered perched in dry woodlands. The Cooper's and sharpshinned feed mainly on birds and will rarely be seen perched. They can be recognized by their distinctive flight pattern of flap-flap-sail repeated over and over or as they flash through the forest after small birds.

Raptors rarely leave footprints, although their wingprints are sometimes seen in the snow where they have briefly hovered while capturing prey. They do, however, all leave one unmistakable calling card in the form of castings or pellets containing fur, hair and pieces of bone (figure 76). These are the indigestible parts of prey species. Pellets are 1 to 2 inches (2.5 to 5 cm) long, shaped like a pecan, and are various colors depending on the prey species. They are cast up 12 to 18 hours after feeding and are often found in abundance where an owl roosts regularly. These castings may also be found in the vicinity of a raptor nest. Other evidence of

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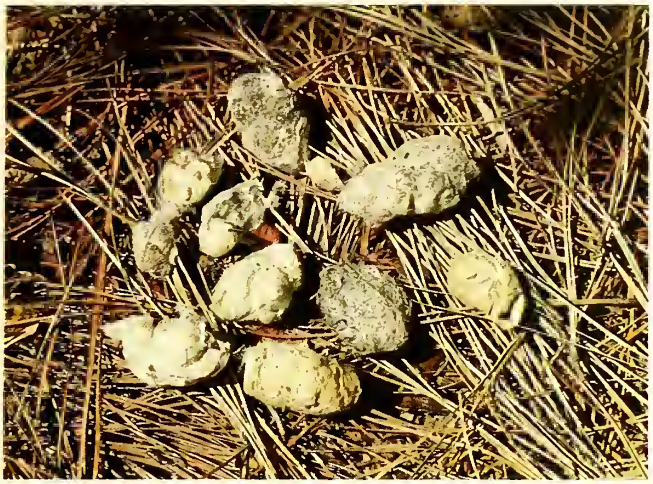

Figure 76.–Castings or pellets are shaped like a pecan and may be varied in color.

raptors such as bird hawks are groups of feathers found in woods and fields where a prey species has been caught and plucked before eating.

The resident population of most hawks in the South is relatively small. Resident birds are conspicuous in their courtship during March and April. By August, the young of the year are fledged and easily observed. However the arrival of winter brings large numbers of birds that leave the North to winter in the warmer climate. Some hawks start migrating in September and these birds build up to peak numbers in late October. Almost any main ridge of the mountains with a pasture or other open area is a suitable observation spot (figure 77). A fire tower is particularly good. The birds stream through on good days with a northwest wind; often with 10 to 15 in sight at a time. Many times this number may be seen and, with good fortune, one may see a flight of several thousand broadwings with hundreds in sight simultaneously. By December, bad weather in the North has driven many redtails South so that the winter population greatly exceeds that of the residents. These birds perch around fields and particularly like the grassy cuts and fills along interstate highways where they feed on cottonrats. It is not at all uncommon to observe a redtail each mile along an interstate. Kestrels (sparrow hawks), too, commonly sit on powerlines along highways and in pastures.

Figure 77.–High ridges overlooking open areas are ideal locations to observe hawks' use of their habitat.

For hawk watching, good field glasses are necessary. If on a ridge where the birds are coming by fairly low, a good blind helps. Another requirement is a good field identification guide book. Highly recommended is *The Audubon Society Field Guide to North American Birds.* This is available for the Eastern or Western region of the country.

Some raptor nests are easily spotted and some are very difficult to find. The eagle and osprey use large conspicuous nests near water. Tall loblolly pines are the favorite nest tree for the Southern bald eagle. Ospreys will nest on artificial structures and in large cypress trees (figure 78). The smaller owls and the kestrel nest in hollow trees.

The other hawks and owls use large stick nests in tall hardwoods or pines except for the peregrine falcon, which nests on large rock

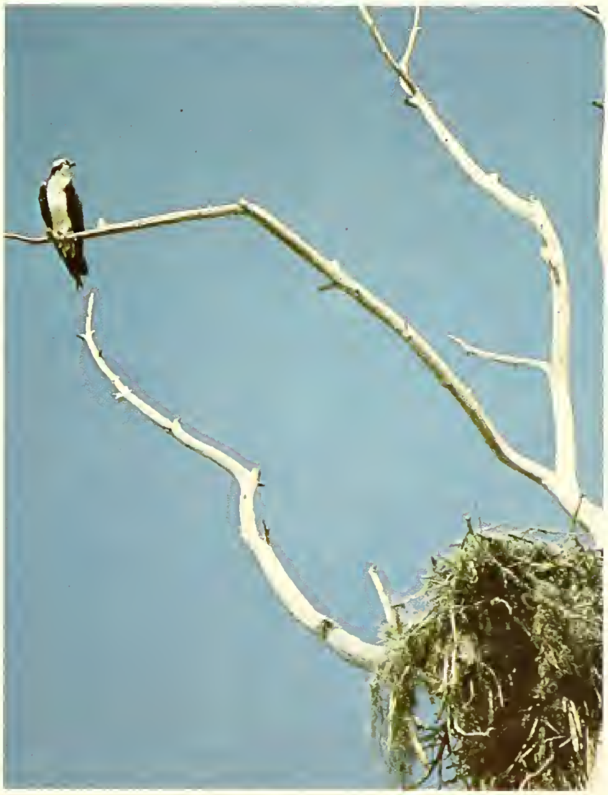

Figure 78.–Osprey nest near the water. Nest structure appears like a large mass of sticks perched on a platform or in a tree snag.

cliffs. The nest of the Cooper's and sharpshinned are very difficult to find, while the nest of the buteos (the generic name for the redtail, broadwing and other large sailing hawks) can be located by watching the birds in the early spring before the leaves on trees are fully grown.

The best way to learn to identify the raptors is by learning their markings, size, flight patterns and habitat.

245

WILD TURKEYS

by Herman L. Holbrook* and William M. Healy**

Habitat Requirements

The wild turkey occurs in extensive forest lands in the south. Good turkey range contains mature stands of mixed hardwoods, groups of sawtimber-size conifers, relatively open understories, scattered clearings, well-distributed water, reasonable freedom from disturbance, and adequate range.

The mixed hardwoods produce mast, which is the primary winter food of turkeys. Conifers afford escape cover, roosting sites, and protection during extreme weather. Relatively open understories contain fruit-producing shrubs preferred during fall and winter. Dense laurel thickets are generally used only for nesting or as temporary refuge when turkeys are closely pursued. Clearings produce food needed during the warm months of the year (grass seed, insects, dewberries and blackberries, and forage). Clearings also serve as breeding, nesting, and brooding areas. Even though their demand for water is not completely understood, turkeys readily use open streams, ponds, and prepared waterholes. The essential requirements for food, cover, water, and reproduction should be met within a home range of about a square mile (2.5 km^2).

Frequent and sustained disturbance by free-running dogs, vehicles, or people may make essential elements of habitat unavailable or cause turkeys to temporarily forsake portions of their range.

Activity

Wild turkeys are very difficult to approach. Their keen eyesight and hearing permit them to detect enemies and maintain regular contact with other birds of the flock as they move through the forest. Turkeys are social and the birds are continually vying for status. Each member of the flock has its place in the peck order. Turkeys communicate with a complex language of calls and postures. The louder calls can be readily heard over long distances, and these calls can be imitated to attract birds when they are separated from each other. Turkeys can be watched from concealment or from vehicles at distances of several hundred yards. But one must remember that they can detect the slightest movement or sound, and a warning from one bird will send the entire flock running or flying.

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In the fall, flocks are composed of one or more hens and their poults of the year, including the young gobblers. Old gobblers (more than 1.5 years) travel in bands composed only of gobblers. The birds of a flock have a strong attachment for each other, but not for birds of other flocks. In spring, the flocks break up and old gobblers often team up in two's to gobble, strut, or control breeding grounds.

Distinguishing Features

The main way to distinguish hens and gobblers in the fall is the caruncles on the front of the neck of the gobbler and their absence on the hen (figure 79). The presence of brown down on the neck and head on the hen and its absence on the gobbler's head also is of aid. In spring, the head color of adult gobblers changes readily to reds, blues and whites, depending upon emotional stimuli. The fleshy, blue-white cap on top of the head is particularly noticable. Beards are not reliable to distinguish between sexes. Many old hens develop beards; 7 out of 10 hens trapped on one occasion on the Francis Marion National Forest had beards. The function of the beard is sensory; it indicates obstacles when walking or running.

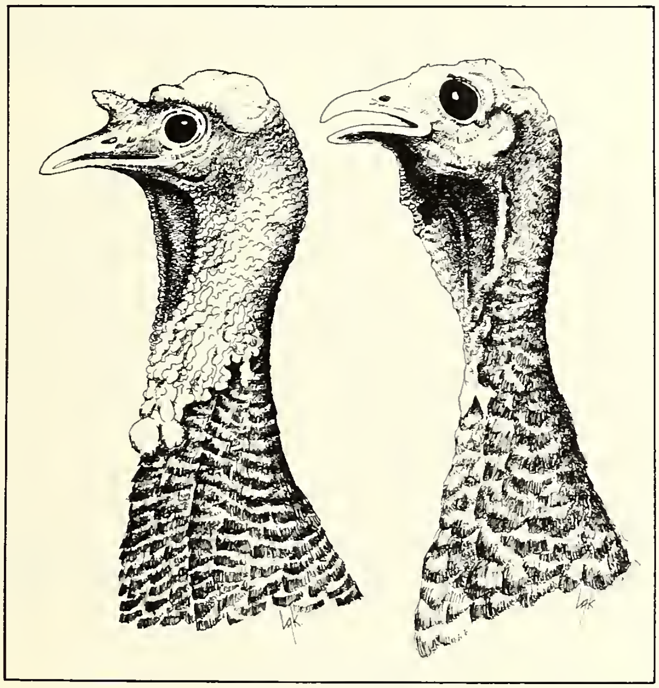

Figure 79.–Gobblers (left) have caruncles on the front of the neck, and little or no down. Hens (right) have brown down on the neck and head, and lack caruncles.

Adult hens are only about two-thirds the size of gobblers. Even the first-year gobblers will be as large or larger than the hens in late fall and early winter. Gobblers have black-tipped, iridescent body feathers that give them a dark, lustrous appearance (figure 80), and the hens are dun or dusty brown because of buff or chestnut-tipped feathers. Gobblers are angular in outline and hens are trim.

In the fall, first-year birds can be identified by the pointed tips on the outer two or three flight feathers (figure 81) and the long feathers in the

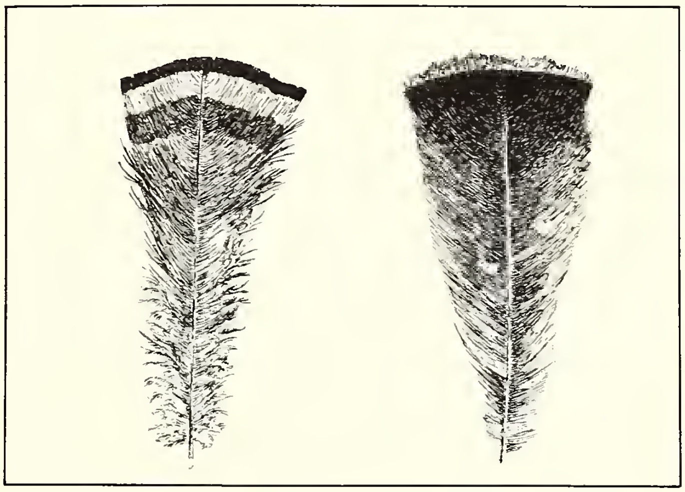

Figure 80.–Gobblers have black-tipped, irridescent body feathers (left), while hens have dusty-brown or chestnut-tipped body feathers (right).

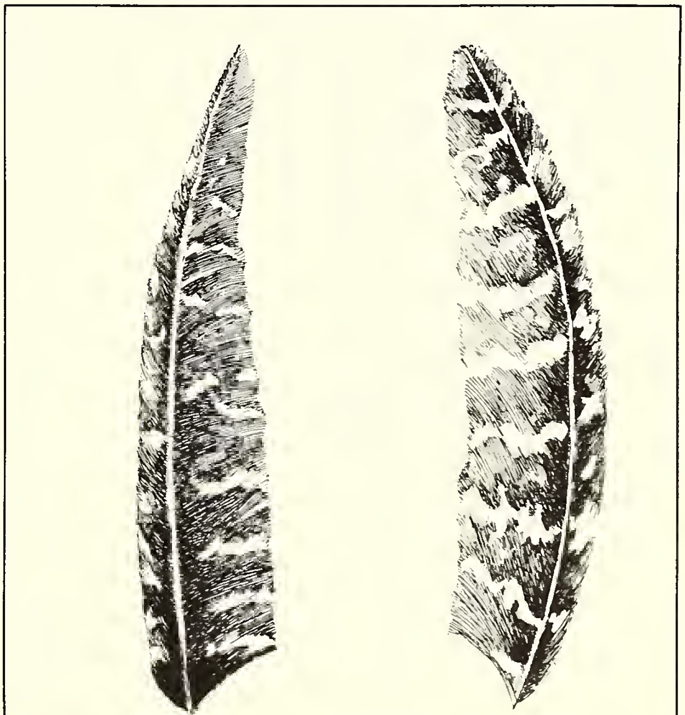

Figure 81.–Primaries (outer flight feathers) of immature, wild turkeys are pointed (left), while those of adults are rounded (right).

middle of the tail flanked by shorter outside tail feathers (figure 82). These long, central tail feathers are obvious in flight. The tail feathers of adults are all about the same length, so the profile of the fanned tail is smooth. In the spring, old gobblers develop a large breast sponge of fatty material, and although they are quite capable of launching into flight with one step, they would rather run than fly. Hens take to flight much more readily.

Wild turkey gobblers can run about 22 miles (35 km) per hour through open woods. They fly about 35 miles (56 km) per hour when gaining altitude from the gound to the treetops, and they attain 50 miles (80 km) per hour after they level off over the trees.

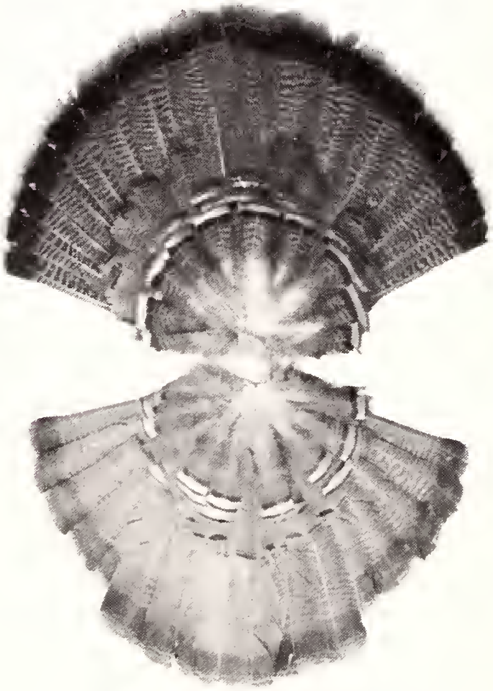

Figure 82.–Tail fan of adult bird (top) and first year bird (bottom).

Signs

Turkeys leave abundant signs when they are well-established on their range. Scratching in hardwood leaves (figure 83), scratching in snow, dusting spots, and drag marks caused by the wings of strutting goblers are signs that are easily recognized. Turkey tracks are larger than those of crows and other birds normally found in the forest. An adult gobbler's track will be 4½ inches (11.4 cm) or more from the tip of the front toe to the back of the pad (figures 84 and 85).

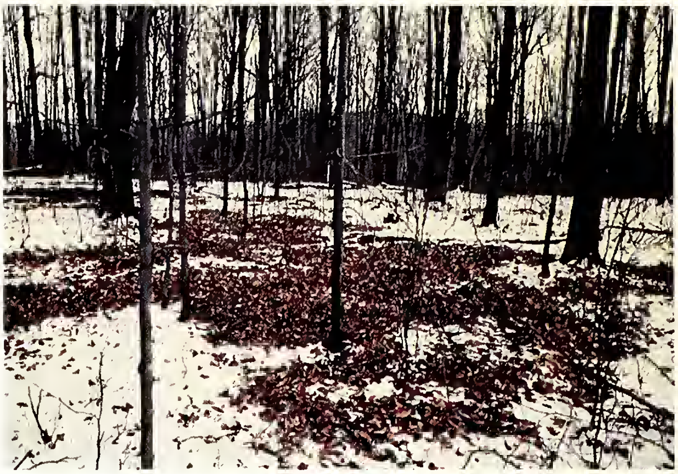

Figure 83.–Turkey scratch in a beech stand.

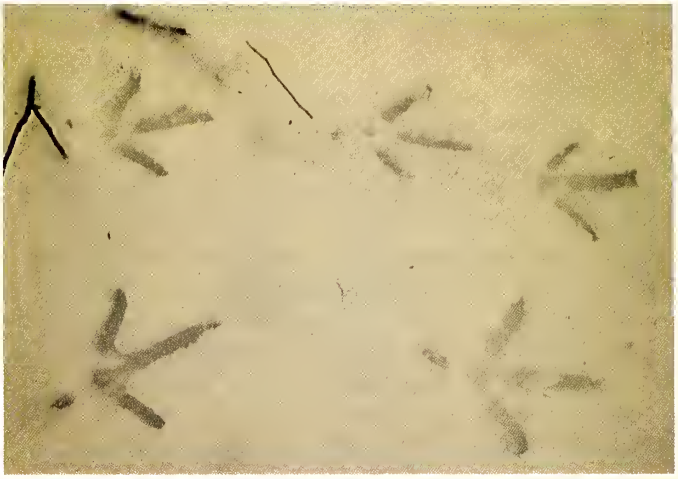

Figure 84.–Hen tracks (top) are slightly smaller than those of the gobbler (bottom).

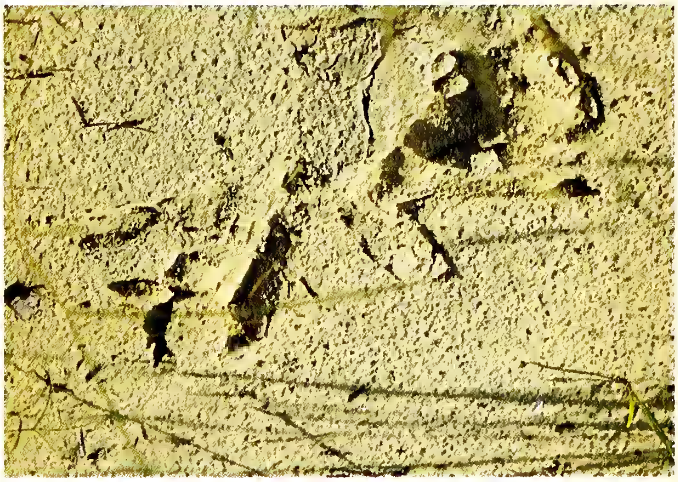

Figure 85.–Turkey tracks are readily distinguishable in sand and soft moist soil.

Nests

Nests are usually located so that hens have a wide field of view but can remain hidden in the undergrowth (figure 86). Favorite sites are at the base of trees or stumps, or under slash from tree tops. In nests that have hatched successfully, the large end of the eggshell is neatly cut off. When predators destroy the nest, the egg shells are crushed, broken, or absent.

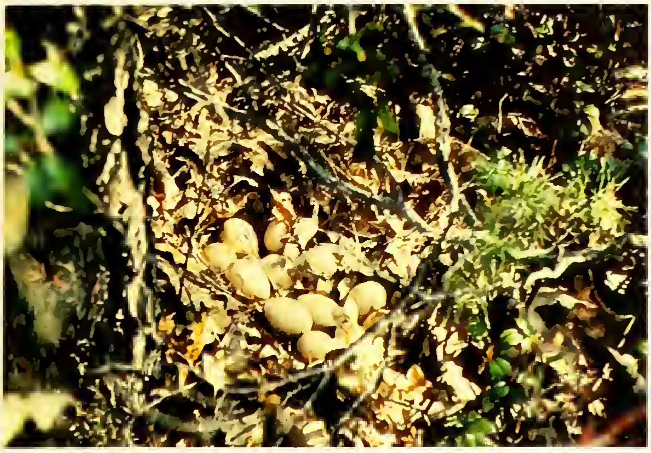

Figure 86.–A typical turkey nest site.

Calls

Turkeys are quite vocal, and as in humans, the calls of individual turkeys can be recognized, at least by other turkeys. Most turkey calls are complex signals, and changes in the speed or pitch of the call will change the way other birds respond to it. For example, a few soft kelks given by a hen will tell her poults where she is, but the same kelks given more rapidly and at a higher pitch will bring poults running to the hen. It is hard to predict how a bird will respond to a particular call because the bird's response depends on its sex and age, the time of year, and probably other factors that we do not understand. Hens with poults will rush toward the peep call of a lost chick, but other poults and gobblers ignore it. Hens will actively defend poults from snakes and crows, and even feint at people at times. They will also pretend injury to lead predators away from poults.

Turkeys have a strong tendency to form flocks, and the birds in a flock call frequently to maintain contact with each other. If a hen or poult is separated from its flock, it will usually travel rapidly through the forest calling loudly and frequently, and it will usually run towards the call of other birds. The kee-kee run call given by lost poults is one of the most effective calls for attracting such birds and at times even whole flocks will respond to it. Adult males occasionally gobble on calm, sunny mornings in winter, but they do most of their gobbling in February, March, April, and May. On clear spring mornings, the gobble can be heard for up to a mile. If one comprehends the structure of the flocks and can intrude as one of the group, wild turkeys can be called at most seasons of the year.

OTHER BIRDS

by Robert G. Hooper*

In addition to the cavity nesters, game birds, hawks and owls, there are over 100 other species of birds that use Southern forests for breeding or wintering habitat. These are represented by several groups including flycatchers, jays, thrashers, thrushes, kinglets, vireos, warblers, blackbirds, tanagers, sparrows, and others.

These birds are generally small to medium size and leave little physical evidence of their use of habitats. Much of their food is consumed whole. Droppings are small and deposited over a wide area. Most seldom walk on the ground and those that do leave few discernible tracks. Some of these birds build nests on limbs of shrubs and trees, and some nest on the ground. Even though the majority of nests in forests are typically below 20 feet (6 m) they are difficult to find (figure 87). Nests can be identified by watching the birds using them or by consulting a field guide to nests.

Figure 87.–Nests are usually well hidden from the eyes of casual observers.

Nonetheless, it is relatively easy to observe use of habitats by the majority of these species. They call frequently, and are generally mobile. A brief pause by an observer will often reveal the presence of several species foraging or singing nearby.

Detectability of birds varies from season to season and by time of day. May and June, when most species are nesting, are the easiest months to observe use of habitats by summer residents. Males are singing to attract a mate and to defend their territories (figure 88). Singing males are most active, as a rule, in the early morning and late afternoon. Each species has a distinct call, but some skill is necessary to identify the species singing a particular song. The best way

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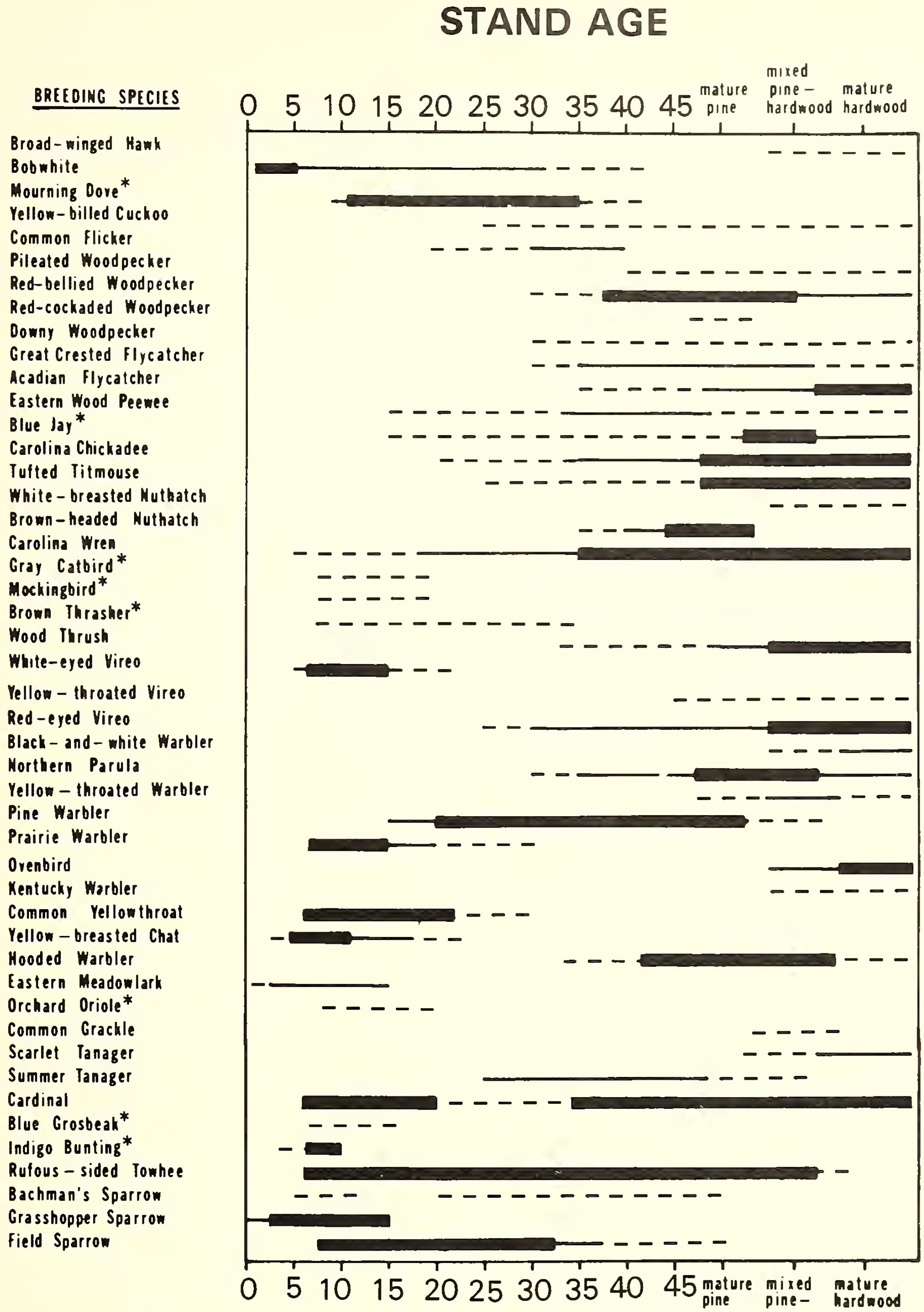
Figure 88.–Male birds sing to attract a mate and to defend their territories.

to learn bird songs is to find and identify the singer; commercially available recordings of songs provide a useful reference. Several good field guides for visual identification of birds are readily available.

After nesting is complete, most species moult. During this time, in late summer, many species are secretive and difficult to find even though they remain in the same habitats. Many of the common summer species, such as the red-eyed vireo and wood thrush, migrate in the fall. But some northern species, such as the yellow-rumped warbler and ruby-crowned kinglet, are common in southern habitats in winter. The net result of these changes is that many habitats in the northern tier of southern States have fewer species and numbers of birds in winter than in summer. Some habitats in the deep South have as many species and numbers of birds in winter as they do in summer, although many of the species are different.

Each species has its preferred habitat but most, such as the rufus-sided towhee and cardinal, occur in more than one forest type and stage of stand development. Likewise, each forest type can be thought of as having a fairly typical community of birds for each stage in its development. Figure 89 provides guidance on the forest age classes used by many birds. Knowledge of the information shown in this chart can help greatly in predicting bird use of various forest types. Many of these specific relationships are discussed by De Graff in *Management of Southern Forests for Nongame Birds,* Gen. Tech. Report, SE-14 (1978). Free copies are available from Southeastern Forest Experiment Station, Publication Office, P.O. Box 2570, Asheville, N.C. 28802.



*"Edge" species (Johnston and Odum 1956)

Figure 89.–The approximate density of selected breeding birds in the seral stages of loblolly-shortleaf pine and oak-hickory forests. Dashed line = ≤3 pairs per 40 ha, solid line = *>5<10 pairs per ha, and solid bar = >10 pairs per 40 ha (from Myers and Johnson, 1978).*

From Meyers and Johnson, 1978